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FERTILITY AND STERILITY

A HISTOLOGIC STUDY OF THE SPERMATOZOA, THE OVARIES, AND THE UTERINE AND VAGINAL SECRETIONS IN THEIR RELATION TO THIS QUESTION *

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No fact is more evident in practice than that the differential diagnosis of the cause of sterility in a given "mating" demands prolonged and accurate study to determine which of the many factors concerned[1] is at fault in the given case. Increasing experience has, moreover, made it evident that the rough clinical methods which I have hitherto used were inadequate for the accurate establishment of such a diagnosis, and has led me to undertake during the last year a somewhat extensive search for more exact methods. The results obtained are already far too voluminous for presentation in any single paper, more especially under the time limitations imposed at this meeting.

The subjects which I mean to take up here in brief abstract are, first, the determination of the original vitality of the spermatozoa deposited by a given male; second, the conditions which permit or prevent effective ovulation; third, the value of microscopic study of both the cellular and bacterial contents of the secretions of the female genitals; and fourth, the microscopic determination of the influence of an individual secretion on the corresponding set of spermatozoa. Many of the points made will be shown in photomicrographs.

The first subject to be taken up is the determination of the fertility of the male who is concerned in the given mating by observation of his spermatozoa.

It has been a general impression among the profession that if even a few motile spermatozoa are found in a specimen of semen, fertility may be expected; but a practical familiarity with the processes of impregnation as observed microscopically makes it at once apparent that the numerical improbability of impregnation under such circumstances is far greater than has been supposed.

Normally even the extremely small quantity of the contents of the vaginal pool which can be seen in a single field under the microscope contains an almost uncountable number of spermatozoa[2] (Fig. 1). A single field from the cervix seldom contains more than twenty or thirty of them (Fig. 2); and in the secretions from the fundus of the uterus the discovery of a single active spermatozoon after searching several slides must be regarded as a normally high occurrence;[3] even then the spermatozoon has not reached its end.

Fig. 2.—Cervical field, showing high occurrence of spermatozoa, following coitus; × 680.

My own studies have gone perhaps further than this, tending to show that in estimating the fertility of a given male we must judge not only of the numerical frequency of the spermatozoa and of the percentage of motility present, but must further study carefully their vitality, both as it is determined by duration observations and, still more importantly, by the quality of the motility present.

All the normal motions appear to be consecutive phases. Initial motion, i. e., motion as seen in fresh semen under favorable conditions, consists of a lashing of the after part of the tail from side to side which is so rapid as to constitute vibration. It produces rapid forward motion in a practically straight line, the head, middle piece and forward portion of the tail maintaining their position in the line of motion with practically no swaying from side to side. The action of the flagellum is so rapid that it is quite impossible to follow its individual movements. Spermatozoa swimming in this manner always head against a current and usually cross the field of observation[4] in about

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* Because of lack of space, this article is abbreviated in THE JOURNAL. The complete article appears in the Transactions of the Section and in the author's reprints.

2. The total number of spermatozoa in a single ejaculation has been estimated by Lade at over 200,000,000.

4. Under a ⅙ objective and a ½ inch eyepiece.

five seconds in the absence of currents or obstacles. This type of motion will be described throughout the paper as "progressive vibratile" motion. Progressive vibratile motion is normally succeeded after a variable length of time by what I regard as the second phase of normal motion.

The second normal motion differs from the first not only in its character but in markedly reduced speed. The tail movement alters to a long slow stroke from side to side and almost the whole length of the tail partakes in the stroke. This is, moreover, accompanied by swaying of the head and middle piece through an arc which is always considerable and may even equal 90 degrees. The general outline of the spermatozoa, from being practically straight with almost nondetectable sharp, quick, small arc vibration of the aftertail, has become an S in outline (Fig. 2), ith large, slow, plainly perceptible undulations traveling gradually backward throughout the length of the spermatozoon. Speed has been lost and direction seems to be more specifically determined by the surroundings. Individuals at this stage show a pronounced choice of direction, and go up to objects in the medium, from which they later make off as though the movement were determined by tactile reaction to some extent. This type of motion has therefore been named "undulatory tactile" [5] in contradistinction to "progressive vibratile."

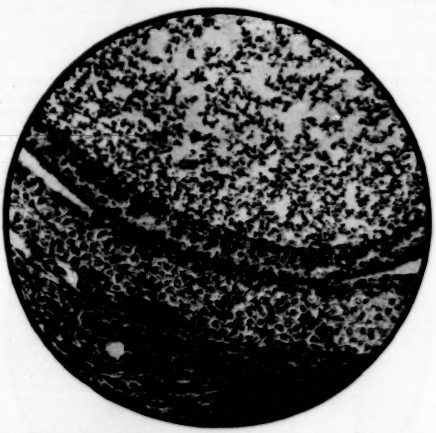

Fig. 5.—Section of graafian follicle, showing normal three layers of the follicle wall, without separation of wandering cells from the membrana granulosa; × 150.

The third type of normal motion succeeds the second and consists in a tendency on the part of the spermatozoon to push itself against or into any small masses of cells, or sometimes other materials, which it may find in the neighborhood, bunting itself into any small cove that can be found, and maintaining a slight burrowing motion by a lashing tail movement of the vibratile type not unlike the movements of the caudal fin of a fish. The movement of the flagellum in this third type is unlike the second type in that it is vibratile rather than lashing, but is slower than the vibratile motion of the first type and less limited to the afterpart of the tail. These spermatozoa are apparently not caught in the débris or unable to move off. From time to time they back out of such a cove, and seek another mooring place.

This "stationary bunting" motion is less universal than the other two. Many individual spermatozoa fail to attain it. It seems probable that only the most vigorous individuals ever reach this stage. It has not been encountered in unmixed semen or in any artificial mediums. It has been observed only when the spermatozoon is in the secretions of the female genital tract. It is most frequent when the spermatozoon is in contact with a nest of epithelial cells.

5. It is probable that the less familiar word "tactic" would more exactly express the motion, which is very probably due to chemical rather than physical perception.

The clinical value of this study of the types of motion in spermatozoa lies in the fact that it has developed a comparatively rapid method of estimation of vitality.

The three types of normal motion are not only distinctive but are always consecutive, i. e., the second follows the first after a period which is apparently determined both by initial vitality and by the favorable or unfavorable character of the medium, while the third has been observed to occur only in individuals which have already developed the second. They apparently constitute a normal cycle.

This cycle is open to the theoretical explanation that these types of motion are directly adapted to the function of the spermatozoon; thus, the progressive vibratile motion which is characteristic of the earliest period of its existence appears especially suitable for its prolonged journey through the cervix and uterus to the fundus and tube. This is supported by the fact that during this motion it always heads directly against any existing current, and that during this stage of its journey it must under natural conditions be continuously exposed to the faint outward ciliary currents of the mucous membrane of these passages.

The undulatory tactile motion which succeeds the progressive vibratile would then be well adapted to the later stage in which the spermatozoon has reached the tube, where its success in conjugation is dependent on its finding the ovum rather than on further progress.

The stationary bunting type of motion is that which would be demanded by the passage of the spermatozoon through the egg membrane which has been so often observed in the lower animals.

This very plausible explanation is, however, necessarily theoretical and must probably always remain so, as the conditions which surround the specimen on the field of the microscope vary in so many respects from those in which it accomplishes conjugation in the course of nature; but the practical importance of the study of types of motion is not affected by their explanation.

In the research work the vitality of the spermatozoon has been determined for each specimen first by notation of the number of hours during which motility persists in the unmixed semen, second, of the number of hours in which motility persists in the natural mediums (the several secretions of the female genital tract), and, third, in various artificial mediums. Comparison of these results has seemed to give an accurate establishment of the vitality of the semen, but the process involves a great amount of labor and is too cumbrous for general use.

The observations made have shown conclusively that in fresh specimens of semen which subsequently show prolonged vitality, nearly all the motion seen is of the

progressive vibratile type when the slide is first placed under the microscope.[7] Under the thoroughly abnormal conditions incident to observation (e. g., exposure to light, variations of temperature, etc.), many individuals lose their motility while the rest are still in this stage, but those which die early are straight and drift unattached after death, and the motion seen remains predominatingly progressive vibratile. In such semen the first undulatory tactile motion appears late and even after this motion becomes general it is maintained for many hours, after which specimens which are in admixture with the natural mediums tend to maintain the stationary bunting motion for several hours.

In specimens which have later proved to show poor vitality, there has usually been on the other hand a somewhat low percentage of motility at the start, i. e., the number of motionless specimens has been large. In such semen some instances of undulatory tactile motion may be present at the first observation and a fairly general assumption of this motion occurs early, while even in the natural mediums, the stationary bunting form is frequently very rare or nonexistent.

Estimation of the vitality of the spermatozoa by the character of their motion requires less frequent observation and can be accomplished in a much smaller number of hours than is required for duration of motion tests and the submission of a specimen to several different mediums. It appears to be thoroughly reliable and is no more cumbrous than most of the laboratory tests on which we have grown to rely as aids to clinical diagnosis.[8] In estimating the initial vitality of the spermatozoa by this method, the abnormal types of motion may be disregarded.

When these observations on types of motion are taken in connection with the very definite results obtained by the enormous numbers of observations on quadrupeds which have been reported from the breeding laboratories, it becomes evident that the ordinary, cursory examination of a drop of semen which is usually considered sufficient for clinical purposes is in fact entirely inadequate for the determination of positive fertility in the male.

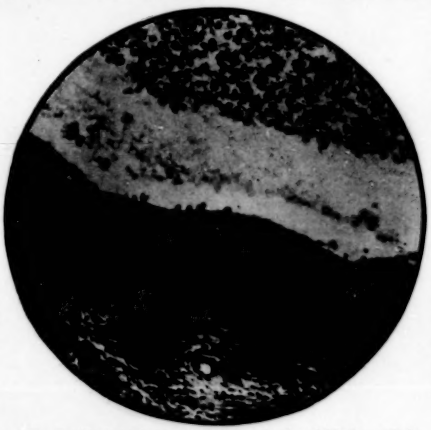

Fig. 8.—Section of graafian follicle, showing follicular wall in which the membrana granulosa has disintegrated into wandering cells; × 150. The thecal layers undulate slightly, suggesting the earliest stage of infolding of the theca to form luteal structures.

CONDITIONS NECESSARY TO EFFECTIVE OVULATION

Fertility is always the result of conjugation between a spermatozoon and an ovum. Sterility from deficient ovulation is not only one of the most important and complete forms of sterility, but is of all others that which has long seemed most mysterious and beyond our diagnostic powers. It has been so because we have heretofore had no knowledge of the conditions in the ovary which prevent ovulation. It becomes comprehensible as soon as we have an anatomic conception of the distinctive characteristics of the sterile ovary.

Most of the previously published work on the histology of the human ovary is purely anatomic, and loses value for the study of function because the clinical history of the organs studied is for the most part unknown.

The description of the nonovulating ovary which is now to be set forth will perhaps be most comprehensible if it is preceded by a contrasting description of the normal ovary, and both descriptions must embrace both the gross and histologic characteristics of the organ.

In this necessarily brief and provisional presentation it will be impossible to enter on the full histologic argument, and only those points which are of especial clinical significance will be mentioned now.

At the start emphasis must be laid on the basic fact that the human female is a uniparous animal, and her ovaries, like those of other animals which normally bear but one at a birth, normally contain, at one time, but one fully mature[9] follicle, and in consequence of this single occurrence of the mature follicle but one recent and active corpus. The multifollicular and multicorporal condition which is characteristic of pluriparous animals is not normal in the human female.

The ovaries of a fertile woman are, then, characteristically, organs of uniform outline which show not more than one thin-walled and projecting follicle[10] or corpus. They have throughout a characteristic soft and elastic feel when taken between the fingers, except when a single mature follicle or active corpus distends one portion of an ovary and yields its characteristic tactile sensation at that point.

In contrast, the ovaries of sterile women usually show on gross examination the presence of numerous thin-walled projecting follicles, or of numerous small imperfect looking corpora, or both. They are of lobulated outline, and on tactile examination between the fingers are tense and resistant in feel over the whole or at all events the greater part of the organ.

These facts have long been clinically familiar to me as the result of a large number of recorded observations made in the course of operative work on fertile and sterile women, respectively. The histologic explanation of them which I have now to offer is the result of recent work.

My studies of serial sections of nineteen ovaries from fertile[11] and sterile women, or of portions of them as removed at operations, have led to a recogni-

9. A mature follicle is not only of large size but also protrudes above the surface of the ovary and is visibly thin walled on its external surface.

10. This is probably not always true of those periods in the life of a fertile woman in which ovulation is inhibited, namely, pregnancy, the puerperal state, lactation and perhaps some pathologic conditions.

11. The number of sections from fertile women has naturally been limited but has, I think, been sufficient.

tion of histologic differentiations of type which correspond fairly closely with the differences in gross conditions.

Three types of mature follicles and two types of corpora are differentiated with ease, and the distribution of these types in the ovary is of much functional importance.

For purposes of primary classification these types of follicles and corpora will be here designated as the A, B and C follicles and A and B corpora, and will now be described.

The normal follicles, which will be designated as A follicles, show in completeness three important layers, the external theca, the internal theca and the membrana granulosa, in one point of which latter is developed in these follicles the discus proligerus which contains the ovum.

The presence of the normal discus and ovum is of course the essential characteristic of the normal and functionating follicle (Fig. 4).

In a mature A follicle the membrana granulosa is present as a continuous lining in the whole follicle. Such an A follicle normally enlarges, and undergoes progressive protrusion from the surface of the ovary until it reaches rupture, when the ovum and at least a part of the discus proligerus are discharged, and the formation of the normal corpus begins.

The second type of follicle, which will be designated as the B follicle, shows a different structural organization. In a typical B follicle the two layers of the theca are present and complete, but the membrana granulosa is no longer continuous. In fact, the distinguishing characteristic of the mature follicle is that, although it is superficial, protruding from the surface of the ovary, and thin walled like the normal mature A follicle, its membrana granulosa is no longer continuous but is found to be in varying stages of disintegration[12] (Figs. 3-6).

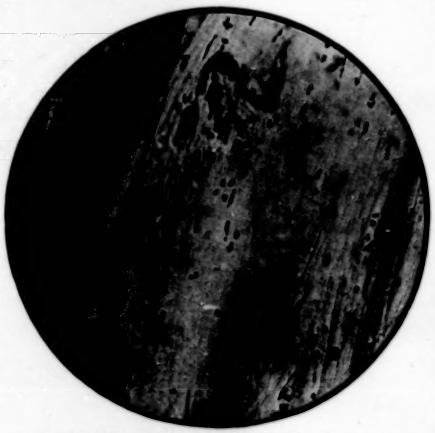

Fig. 16.—Field from cervical smear, showing customary distribution of leukocytes, mucus, and occasional cervical epithelial cells; × 150.

The process of disintegration seen in these B follicles may or may not be identical with that seen in the small deeply seated atretic follicles so often described. This point is not here entered on, but is reserved for future discussion. This B follicle is apparently functionally imperfect. Its multiple presence at the surface of the ovary is highly characteristic of the ovaries of sterile women. I have not yet seen these superficial and apparently mature B follicles in the ovary of a woman with a fertile clinical history. There is abundant clinical evidence that when once formed they are usually long persistent.

The type of follicle which has been designated as the C follicle is not important to the purpose of this paper, and may here be dismissed with the statement that these follicles are usually hemorrhagic, differ essentially in the histology of the internal and external theca and are at present regarded as incipient cystomas.

The subsequent history of the B follicles apparently imitates to some extent that of the normal A follicles. Sections now under study make it probable that they sometimes rupture, and there are some indications that they also sometimes disappear by absorption.

Whether the corpora which result from these follicles are induced by actual rupture or begin without rupture on the complete disintegration of the membrana granulosa is not yet established. The absence of the granulosa layer either through discharge of the follicle or through its histologic disintegration into the follicular fluid appears, however, to be constant in the multiple corpora found in ovaries which contain multiple mature B follicles (Figs. 13 and 14).

Since these corpora do not always contain typical lutein cells, some histologists may prefer to speak of them as pseudocorpora; but there is clinical evidence that they are of much functional importance.

These B corpora are usually smaller than those derived from the A follicle, their development is less full and typical, and as the membrana granulosa of the follicles which form them has disappeared, they are necessarily entirely thecal in their composition.

The conditions which govern the production of the B follicles are not yet adequately determined and will require further study. Both from the gross characteristics of the ovaries which contain them and from their distribution in the sections it seems probable that conditions of hypertension in the ovary have a causative relation to their occurrence. Certain phases of Clark's work on the internal circulatory conditions in the ovary are of interest in this connection.

Pressure conditions may well explain the atretic degeneration which is so commonly seen in immature follicles deep in the stroma. Slides in my collection afford some reason for the belief that when several young follicles undergo development too near each other, the occurrence of such a degeneration is nature's method of disposing of the superfluous follicle, and is followed by absorption; but when such a follicle or follicles is found in a normal ovary, the atretic degeneration has always occurred at an early stage in their development, i. e., they are small, occasional in distribution and set deep in the stroma. Figure 15 shows well the typical distribution of young follicles in a normal ovary. One follicle has begun

12. During disintegration the cells of the membrana granulosa may be seen in the process of separating from it as single cells which wander off into the follicular contents and there apparently disappear individually. All stages of the reduction of the membrana granulosa from a layer several cells deep to a single celled layer and in cases to its entire disappearance have been found. The discus is the last epithelial structure to undergo this process. The destruction of the discus probably destroys the ovum. Conclusive evidence on this point is so far lacking, but primary changes in the ovum which suggest its depleting vitality have been observed (Figs. 9 to 12).

development and will outstrip the others. When, exceptionally, two neighboring young follicles undergo development simultaneously, their enlargement progresses until each begins to crowd the other. One or both then undergo degeneration while still but partly mature. This process is not followed by the development of a corpus. On the other hand, the numerous, large, superficial B follicles which characterize the ovaries of sterile women are always accompanied by B corpora also, and such ovaries have not shown a mature A follicle or A corpus.

Classification of the nineteen ovaries examined, by the clinical histories of the women who carried them, shows that those which were characterized by the multiple occurrence of superficial (B) follicles and (B) corpora all belong to sterile women, while the few ovaries containing normal (A) follicles or (A) corpora which have yet been seen have all been carried by fertile[13] women.

The clinical value of these observations on the ovary evidently depends on the light which they may throw on the choice of therapeutic measures to influence the disappearance of the abnormal condition in nonovulating ovaries as well as on any increased possibility of diagnosing the existence of these conditions in a concrete case to which they may lead.

Several previous publications[14] have detailed clinical evidence that conservative operations on the ovaries of sterile women, designed to relieve the undue tension which is characteristic of them, are frequently followed by pregnancy in due course. These histologic observations have, however, proved very illuminating when studied in connection with the variations in the operative procedures which were described in those papers and their comparative results. Later clinical experience has also shown the great importance of careful adaptation of operative methods to the conditions of the individual case. The elaboration of this subject must, however, be reserved for a future paper.

In my earlier work the diagnosis of ovarian infertility was largely made by exclusion after investigating the other factors in sterility, and finally determined only by inspection of the ovaries after an exploratory abdominal incision. Of late years the possibility of making an accurate diagnosis of the conditions which determine nonovulation in clinical work, and in advance of operation has occupied much of my thought, more especially the possibility of differential diagnosis between the ovaries in which undue tension is produced by (B) follicles and those in which it is produced by persistent corpora of either of the two types. I had hoped to be ready to present some discussion of this question in connection with this paper, but lack of time for the extended analysis of cases necessary has prevented it. It will demand also more extended space than would be possible here. It may be said, however, that in favorable cases, by the use of the rectovagino-abdominal examination under anesthesia, and by a careful comparison of the results obtained with the symptomatology, a fair clinical guess of the condition of the ovary can often be made in advance of operation. The majority of failures in diagnosis will consist in failing to find evidence of a nonovulating condition which in fact exists. Definite evidence of its presence, so obtained, is usually trustworthy.

Fig. 17.—Field from cervical smear, showing high leukocyte content in the cervix, and mucous threads; × 340.

CHARACTER OF THE SECRETIONS OF THE FEMALE GENITAL TRACT

For the sake of clearness I shall first describe the gross appearance and cellular content of the secretions of the uterine body, of the cervix and of the vagina, after which I shall speak of the bacterial flora of the vagina separately.

In studying these secretions the chemical reaction, the cell content, and the bacterial content have been particularly watched, the latter two requiring the use of stained smears, of which over a thousand slides have been studied.

The secretion of the uterine body is clear and limpid and is normally free from both bacteria and detectable mucus. The technical difficulties in the way of obtaining it without contamination from the secretions of the cervix and in quantity sufficient for observation are very great and must make any clinical statements about it somewhat cautious in form. It is probably more favorable to the life of the spermatozoon than either of the lower secretions. In the few specimens which have been obtained in fair quantity entirely free from trauma (absence of red blood corpuscles), and apparently free from cervical contamination, the secretion has been thin, clear, and almost free from cellular content of any kind.

The cervical secretion is, on gross examination, normally alkaline, clear and limpid, but is mixed with quantities of normally clear but tenacious mucus which is the product of the cervical glands. It is also normally bacteria free.

Its cellular content (Fig. 16) consists of detached uterine and cervical cells, leukocytes, and occasionally cells whose appearance suggests their descent from the extreme upper part of the genital tract. It shows a marked and most important cyclical variation in correspondence with the period of the catamenial month; indeed, the precatamenial or postcatamenial origin of a given slide can be very accurately predicated from

13. One presumably fertile woman with such an ovary was in the puerperal state, and in amenorrhea, and consequently at the time probably temporarily sterile.

14. Reynolds, Edward: The Ultimate Results of the Conservative Surgery of the Ovaries, Surg., Gynec. and Obst., March, 1912, p. 255; The Theory and Practice of the Treatment of Sterility in Women, THE JOURNAL A. M. A., Jan. 11, 1913, p. 93; Further Points on the Sterility of Women, ibid., Oct. 11, 1913, p. 1363; Prognosis of Sterility, ibid., Oct. 2, 1915, p. 1151.

the character of its cellular content without reference to the clinical history. The greatly increased flow of cervical mucus which appears to characterize the post-coital period also modifies the cervical content extensively. The variations in the leukocyte content of the cervical secretion are of especial clinical interest. Without pretending to enter here into details, it may be said that in many sterile women the cervical leukocytosis (Fig. 17) is very like the vaginal leukocytosis in vaginitis. The leukocytes are often of very varied types and are distributed mainly, if not entirely, along or in the substance of the mucous threads. This condition probably represents a mild inflammatory state in the glands of the cervical mucous membrane.

The upper vagina is destitute of secretory glands. The fluids which are found within it are made up mainly of the uterine secretions which escape into it. These are probably usually increased to a greater or less extent by osmotic transudation of serum through its walls. They are also greatly modified by the products of bacterial activity which are always present in the vagina. The vaginal secretion is normally somewhat acid and is normally moderately unfavorable to the spermatozoa. Its gross physical characteristics are largely determined by the character of the bacteria which the individual vagina contains.

The cell content of the vagina necessarily contains that of the cervix and in addition vaginal epithelium. The character of the vaginal epithelium as seen in these secretions varies markedly in correspondence with the age and social condition of the patient.

The cell content of both secretions is of marked importance to the estimation of their favorable or unfavorable influence on the spermatozoa, but the variations in the character of the bacterial flora of the vagina are even more important.

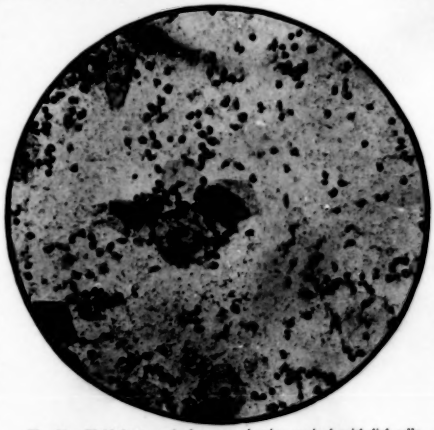

Fig. 18.—Field from vaginal smear, showing vaginal epithelial cells and high but temporary distribution of leukocytes; × 340.

SOME PHASES OF THE BACTERIOLOGY OF THE VAGINA

My studies of this have included observations on virgins, widows, fertile married women, sterile married women, and pregnant and puerperal women.

The cultural analysis of so complicated a flora as characterizes the vaginal contents is extremely difficult and tedious, and the number of cases studied in this way is not as yet large enough for report. The study of stained smears has, however, resulted in a rough classification of considerable interest and, I think, value.

The flora of the virgins and fertile women so far studied have been coccoid and have usually consisted mainly of one form of coccus, homogeneous[15] (Fig. 21).

One fourth of the sterile women had a coccoid flora, but these were all cases of short standing and of apparently promising outlook. Further clinical analysis of these cases may show that they were instances in which the sterility was not of secretional form, but lack of time has so far prevented this analysis. The other three fourths of the sterile cases had bacillary flora usually containing one dominant form of bacilli (homogeneous).

The bacilli in these sterile cases were ordinarily rather low in occurrence and somewhat distinctive in appearance. Moreover, they presented a very characteristic distribution of attachment or superposition on the vaginal epithelial cells which is less marked among the other bacillary flora (Fig. 22).

All the pregnant and puerperal women had bacillary flora, but these showed always the presence of several forms in approximately equal numbers.

The general similarity between the flora of established sterility, on the one hand, and those of pregnancy and the puerperal state, on the other, seems interesting in view of the probable nonovulating condition of the ovaries during pregnancy, and the puerperal state, and in a large proportion of all sterile cases.

An entirely unexpected and most curious feature of the bacterial content is the extreme distinctiveness and considerable permanence which is usually characteristic of flora of individual women. The bacterial content varies extremely in different cases, and yet remains so constant in each individual case, in occurrence, type and persistence, that the smears of a case under study can practically be recognized by its flora, and can be grouped with other cases of similar content. This constancy of the individual flora is especially astonishing when we consider the liability of the vagina of a married woman to the introduction of varying forms. Great variations and occasional complete changes would have been expected, *a priori*. Such alterations have not been observed.[16] The vaginal flora bears no relation to the flora of the penis in any one of the several cases in which smears from both members of the mating have been observed.

There is every indication that in spite of the external relations of the vagina, the variations in its flora are not determined by the introduction of bacteria from without (except in the occasional infections by pathogenic forms) but by the secretory conditions of the upper genital tract, which apparently determine the types of bacteria that can obtain a foothold temporarily or establish themselves permanently. In other words, the character of the individual flora is probably determined by the environmental conditions of the individual secretions which form its habitat.[17]

IMPORTANCE OF MICROSCOPIC CONDITIONS IN EXPLAINING THE HOSTILITY OF A GIVEN SECRETION TO THE LIFE OF THE SPERMATOZOA[18]

The reactions of the spermatozoa to the vaginal and cervical secretions are quite different and must be con-

sidered separately. The vaginal secretion is normally acid, bacteria laden, and varyingly hostile to the spermatozoa even when admixed with the alkaline semen. Although the vaginal hostility is evidently in the main in rough correspondence with the degree of acidity present, our admixture observations show somewhat conclusively that this hostility is in fact the result of the bacterial conditions which belong with the highly acid secretions,[19] in short, that it is enzymatic rather than merely the result of the acid reaction alone.[20]

The cervical secretion is normally bacteria free and therefore physiologically favorable to the spermatozoa. It is, however, often mechanically hostile to them, and this hostility may be of great practical importance. It is always present in some degree; cervical mucus is always present, and from its adhesive characteristics can always be seen to enmesh and render motionless many spermatozoa. When, however, it is present in unduly large quantity, or in undue adhesiveness, it may well decrease the number of effective spermatozoa to a degree sufficient to render impregnation unlikely or impossible.

When the cervical leukocytosis is high, the mucus always entangles the spermatozoa with great facility, and from microscopic evidence it has become evident that this condition may be quite sufficient to prevent pregnancy in cases which are not only free from symptomatology but present comparatively slight gross evidences of any alteration of the cervical secretion.

Vaginal hostility is mainly enzymatic and of bacterial origin. Cervical hostility is mainly mechanical and of inflammatory origin.

Either or both of these secretions may and frequently do present conditions which absolutely prevent fertility through their destruction of the spermatozoa and which are yet so far external to the physiology of the woman as to excite no ill health, to produce no symptoms other than persistent sterility.

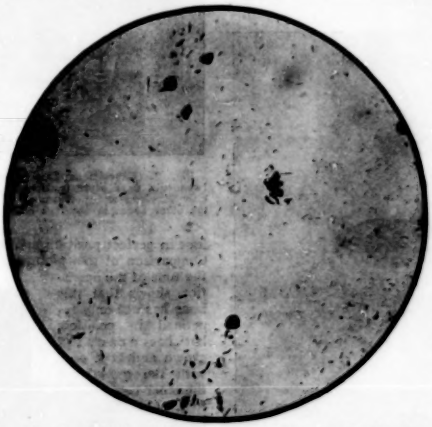

Fig. 20.—Field from hyperacid vagina in which the epithelial cells have disintegrated, leaving the nuclei in free distribution; × 680.

The microscopic study of the secretions is of so much practical value that the after-treatment of cases at a distance can sometimes be effectively guided through the study of smears sent by mail.

Fertility is dependent primarily on the discharge of effective spermatozoa on the one side and the due release of a normal ovum on the other; but the best of spermatozoa and ova are useless to fertility unless the conditions in the female generative tract are such as to permit their conjugation. A fundamental principle of the subject of sterility which has, moreover, attracted too little attention is that alterations in these primary factors which are quite sufficient to produce permanent sterility may often fail to affect the health of either partner.

Our treatment of the ill health of women has been rendered successful by our painfully acquired knowledge of the pathology on which that ill health is dependent; if we are to treat sterility successfully we must proceed to acquire a similar knowledge of the disturbed physiology which produces it.

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ABSTRACT OF DISCUSSION

DR. EMIL NOVAK, Baltimore: Of the many factors which may be concerned in the causation of sterility, I shall discuss only one, the part played by histologic alterations in the ovary. The value of Dr. Reynolds' classification of graafian follicles into various groups is greatly lessened by his failure to recognize that certain of the types described by him are not normally maturing follicles at all, but that they represent follicles undergoing atresia folliculi. The female ovary at birth contains something like 70,000 primitive follicles, of which number only one a month, or less than 400 during the reproductive life of the woman, ever go on to full maturity and ovulation. Many more than this, however, after developing up to a certain point, are inhibited, the ovum dying and the granulosa becoming thinner and finally disappearing. Within certain limits this process is physiologic, although, as in the so-called fibrocystic ovary, it may become so exaggerated as to be pathologic. The atretic follicle does not, of course, go on to rupture, and hence should not be grouped with the normally developing graafian follicle. The corpus luteum is developed after rupture of the latter type of follicle, and never, as Dr. Reynolds states, from the atretic follicle.

DR. E. GUSTAV ZINKE, Cincinnati: There is no one of experience who has not observed, painfully at times, the manner in which some of these unfortunate women are treated by their sometimes stupid or malicious husbands. It is often a cause of refined cruelty on the part of husbands who know themselves to be at fault. One fact must be remembered, however, and that is that three events are necessary to establish a pregnancy. These are: a healthy womb, the presence of a healthy ovum, and healthy spermatozoa. When these are present pregnancy invariably takes place. I agree with Dr. Reynolds that the majority of women are unjustly blamed for the nonoccurrence of pregnancy and that probably more than half of the cases of sterility in women should be charged to the other side of the house.

Loss of Life from War and from Disease.—At Austerlitz, for example, the French lost 14 per cent., the Russians about 30 per cent., and the Austrians the enormous proportion of 44 per cent. of the men engaged. At Waterloo the French lost about 36 per cent. and the English and Prussians about 31 per cent. Taking a score or more of the more important and unusually bloody battles of the last three centuries, the losses on both sides together of dead and wounded run from 20 to 35 per cent. In many bloody battles the losses of a single side have gone up to 50 per cent. These are of course the higher figures. At Magenta the French lost 7 per cent. and the Austrians 8 per cent.; at Lützen the French lost about 13 per cent., and the Prussians and Russians 14 per cent. At Antietam one man out of every five engaged was killed or wounded. In fourteen months the English army under Wellington in the Peninsula lost 4 per cent. by gunfire, but it lost 12 per cent. from disease.—V. L. Kellogg.

EXPERIMENTALLY TRANSPLANTED AND TRANSPOSED WHOLE METATARSAL BONES

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Since the appearance of Gill's article[1] in 1915 on the transplanting of entire bones with their joint surfaces, the results of those experiments have been widely quoted, comparisons being made with other experiments wherein only parts of bones had been transplanted. The results have also been extensively quoted as proof that it is not necessary for bone transplants to be in contact with living osteogenic tissue. On superficial observation, it would appear that they were transplants; but as a matter of fact, they were whole bones transposed.

We at once realized that there were two factors entering into those experiments which possibly had not been duly considered: (1) they were transpositions of whole bones, and (2) they remained in a position in which they had the same function to perform to which they had been accustomed. In 1913 we especially called attention to the importance of function to insure the permanency of bone transplants.[2] Since that time, the importance of this point has been brought more and more forcibly to our attention. Therefore we have repeated Gill's experiments, in part of the cases really transplanting the metatarsal bones, and in the other cases transposing one into the position formerly occupied by the other, as did Gill, making the first a true transplant into the soft tissues, in a position in which there was no function to perform.

Fig. 1 (Experiment 1).—Right second metatarsal transposed in position formerly occupied by the left, immediately following operation.

EXPERIMENT 1.—In Dog 7, New Series, Jan. 21, 1916, black and white tan mongrel, weight 6 pounds, 10 weeks old, the second metatarsal bone was taken complete from each foot, including the periosteum and articular cartilages. The right was replanted into the space vacated by the left, and the left into the right thigh muscles. There was primary union.

A roentgenogram taken three months and twenty-six days later shows the bone transposed from the right to the left foot in perfect position and apparently normal in every way. Comparison of this picture with the roentgenogram taken at the time of the operation shows that this bone has not only remained in position, but has actually grown and kept pace with the growth of the other bones of the foot. On the other hand, the left metatarsal, which was transplanted free into the thigh muscles of the right side, has practically disappeared. This proves, we think, conclusively, that these transpositions should not be considered exactly in the same light as true transplanting into the tissues.

Fig. 2 (Experiment 1).—Roentgenogram taken three months and twenty-six days after transposition shown in Figure 1; bone has not only survived and performed its function, but has actually grown as the other bones of the foot have.

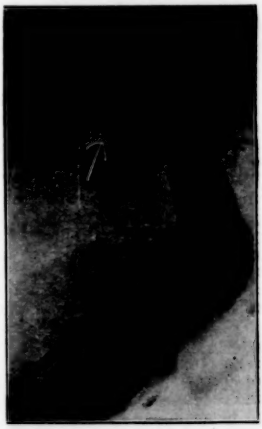

Fig. 3 (Experiment 1). — Left second metatarsal bone transplanted into thigh muscles, immediately following operation.

EXPERIMENT 2.—In Dog 10, New Series, Nov. 6, 1915, small mongrel, weight 10 pounds, 2 years old, the second metatarsal of the right forefoot was removed complete, including the articular cartilages and periosteum, and transplanted into the left thigh muscles. There was primary union. This dog died three months and one day later, and the roentgenogram shows that the transplanted metatarsal is rapidly undergoing absorption.

1. Gill: Transplanting of Entire Bones with Their Joint Surfaces, Ann. Surg., June, 1915.
2. Brown, W. L., and Brown, C. P.: Surg., Gynec. and Obst., 1913, xvii, 681.

EXPERIMENT 3.—In Dog 9, New Series, Dec. 7, 1915, the second metatarsal was removed, including the periosteum and articular surfaces, and planted into the right loin, free into the muscles. There was primary union.

The roentgenogram taken five months and ten days later shows the transplant almost absorbed.

Fig. 4 (Experiment 1).—Same as Figure 3 three months and twenty-six days later; almost completely absorbed.

Fig. 5 (Experiment 2).—Second metatarsal right forefoot transplanted into the muscles of the thigh.

Fig. 6 (Experiment 2).—Same as Figure 5, three months and one day later; absorption well advanced.

While altogether six experiments were performed, the foregoing are sufficient to bring out the point we wish to emphasize.

TECHNIC

All the dogs' feet and sides for the transplants were prepared, after the dog was anesthetized with ether, by shaving and painting with full strength tincture of iodin.

Following the operation, all wounds on the feet were dressed with a liberal quantity of phenolated gauze and adhesive plaster.

The wounds of the thighs and backs were always dressed with collodion and cotton. There were no infections.

Fig. 7 (Experiment 3).—Second right metatarsal, including periosteum and articular surfaces, planted into right loin free in the muscles.

CONCLUSIONS

1. True transplantation of a part or whole bone into the tissue, where it has no function to perform, is a very different matter from transposing an entire bone into the bed of its fellow of the opposite side.

2. Whole metatarsal bones covered with periosteum, their articular ends included, and transposed into the position occupied by their fellow of the opposite side will live, functionate and grow, but when truly transplanted under like circumstances into the tissues, where they do not act as an integral part of the bony framework and have no function to perform, they are invariably absorbed, as are all other transplants under like circumstances, if sufficient time is allowed. Hence, the results of the two experiments are not comparable.

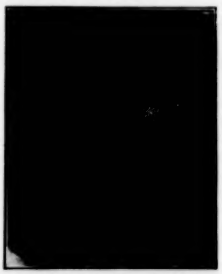

Fig. 8 (Experiment 3).—Same as Figure 7, five months and ten days later; only a flattened, thin, irregular piece of bone left.

The General Practitioner an Investigator.—The time is approaching when, in the course of nature, I must fall out of the ranks, and before doing so I wish to look back on my medical career to see what light my experience may throw on medical science. The life of a general practitioner is not considered one that can help much in the advance of medicine; it is, indeed, regarded so lightly that no steps are ever taken to train one who intends to become a general practitioner in any branch that would enable him to undertake research work. You know well that if a man aspires to research work it is to the laboratories or to the hospital wards he is sent. As a result of my experience, I take a very different view, and assert with confidence that medicine will make but halting progress, while whole fields essential to the progress of medicine will remain unexplored, until the general practitioner takes his place as an investigator. The reason for this is that he has opportunities which no other worker possesses—opportunities which are necessary to the solution of problems essential to the advance of medicine. But before the part that the general practitioner alone can play is understood, we must look on the science of medicine, its teaching, and its pursuit with new light in our eyes.—Sir James Mackenzie.

THE ETIOLOGY OF EPIDEMIC POLIOMYELITIS

PRELIMINARY NOTE *

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E. B. TOWNE, M.D.
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After Landsteiner and Levaditi[1] and Flexner and Lewis[2] demonstrated independently that the causative agent of epidemic poliomyelitis could be passed through a bacterial filter, the disease was classed with those caused by a filterable, ultramicroscopic virus. The bacteria of ordinary size were no longer considered of etiologic importance, and when obtained were discarded as postmortem invaders or accidental contaminations. Wickman,[3] after reviewing the earlier experiments with streptococci, says, "The time has fully arrived when such investigations should be discarded from the literature of the disease."

Fig. 1.—Cross section of Kaiserling specimen of left tonsil removed four hours postmortem in Case 758; acute poliomyelitis in child aged 15 months, × 2½. Part of the material in the abscess cavity, which lies against the capsule of tonsil, fell out during hardening.

In 1913, Flexner and Noguchi[4] cultivated and demonstrated microscopically a small filterable microorganism with which they produced poliomyelitis in monkeys. They note that "the cultural conditions are those that apply more particularly to the bacteria," but do not attempt definitely to classify the micro-organism.

Rosenow[5] has shown by the use of special methods that the specific localizing power of bacteria is an important factor in the etiology of various diseases, including diseases of the nervous system. We felt, therefore, that a reinvestigation of the bacteriology of poliomyelitis by the newer methods was desirable. Accordingly we have made a bacteriologic study of throats, tonsils, blood, spinal fluid, the central nervous system and other tissues in cases of acute poliomyelitis in the present epidemic both in Rochester, Minn., and in New York City, with particular reference to the infecting power of the bacteria isolated. The methods employed were similar to those used by Rosenow and the methods used by Flexner and Noguchi in their studies of poliomyelitis.

A peculiar polymorphous streptococcus has been isolated, often in large numbers, from the throat, from the material expressed from tonsils, and from abscesses in tonsils[6] (Fig. 1) of a large series of cases of epidemic poliomyelitis. It has been obtained from the ventricular fluid after death, and from blood during life in one instance, but not from the spinal fluid. By emulsifying in a sterile air chamber a rather large amount of brain and cord obtained under sterile precautions, and inoculating ascites-dextrose broth, ascites-dextrose agar and ascites fluid containing sterile tissue with varying amounts of the emulsion, we have succeeded in isolating this peculiar streptococcus from brain and cord in each of twelve cases of poliomyelitis in New York City which came to necropsy, and also from the intervertebral ganglia and lymph nodes in some of these cases. Mathers[7] has already reported similar results from the brain and cord. The microorganism has also been recovered in four instances from recently glycerinated pieces of brain and cord.

The micro-organism which we have isolated in cases of human poliomyelitis produces on aerobic blood-agar plates fine, dry, nonadherent, slightly green colonies at times showing in forty-eight hours a narrow, hazy zone of hemolysis. On this medium, as well as in ascites-dextrose agar, the organisms are quite uniform in size and resemble pneumococci, but are usually smaller and free from demonstrable capsule. In tall tubes of ascites-dextrose broth with or without sterile tissue there is usually an early diffuse turbidity, or there may be a flocculent growth which collects along the side of the tube and gradually settles to the bottom. Early smears show short chains of diplococci resembling pneumococci, a smaller number of medium-sized cocci in pairs, and occasionally very small coccus forms. After the first week, the number of small forms is relatively greater, and they have largely become gram-negative. After about three weeks, large clubbed involution forms appear. In ascites plain broth with or without sterile tissue, growth is slower, being noted usually after about thirty-six hours. It tends to appear near the bottom of the tube and extends upward as a moderate turbidity. The organism has the same morphologic characteristics, but is about two-thirds the size of that grown in dextrose broth. Old cultures show clumps of very small coccus forms. In ascites fluid containing sterile tissue the growth appears as a slight haziness near the bottom of the tube on the fourth or fifth day when cultures are made of human or animal brain and cord. Transplants from other mediums grow out in one or two days, and show more marked early

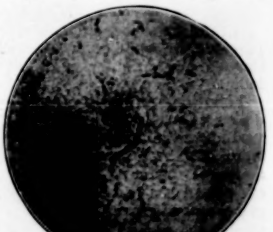

Fig. 2.—Photomicrograph of forty-eight-hour culture in ascites dextrose-tissue broth of Berkefeld N filtrate of emulsion of brain of Rabbit 1017, injected intravenously with pure culture of the streptococcus from poliomyelitis after two rabbit passages. Note the marked variation in size and shape of the organism, the chain of large diplococci and micrococci with a small diplococcus on one end, chains of medium and small diplococci and those of extremely small diplococci and the medium-sized single coccus forms. Gram stain, × 1,000.

* From the laboratories of the Mayo Foundation and the New York Hospital.

1. Landsteiner, K., and Levaditi, C.: La transmission de la paralysie infantile aux singes, Compt. rend. Soc. de biol., 1909, lxvii, 592.
2. Flexner, Simon, and Lewis, P. A.: The Nature of the Virus of Epidemic Poliomyelitis, THE JOURNAL A. M. A., Dec. 18, 1909, p. 2095.
3. Wickman, I.: Acute Poliomyelitis, Nervous and Mental Diseases Monograph Series 16, New York, 1913, p. 6.
4. Flexner, Simon, and Noguchi, H.: Experiments on the Cultivation of the Micro-Organism Causing Epidemic Poliomyelitis, Jour. Exper. Med., 1913, xviii, 461.
5. Rosenow, E. C.: Elective Localization of Streptococci, THE JOURNAL A. M. A., Nov. 13, 1915, p. 1687; Elective Localization of Bacteria in Diseases of the Nervous System, Aug. 26, 1916, p. 662.
6. The importance of the constant finding of such abscesses in tonsils at necropsy in cases of poliomyelitis was emphasized in a discussion by Rosenow of Dr. Robert W. Lovett's paper, "The Management of Poliomyelitis," before the New York Academy of Medicine, Oct. 5, 1916.
7. Mathers, George: Some Bacteriologic Observations on Epidemic Poliomyelitis, THE JOURNAL A. M. A., Sept. 30, 1916, p. 1019.

turbidity. In a very few instances the early smears have shown the tiny globoid bodies described by Flexner and Noguchi in apparently pure culture, but usually there have also been a certain number of medium-sized diplococci in short chains, which Flexner and Noguchi and others have considered contaminations. These larger forms tend to grow smaller, so that frequently at the end of twelve or fourteen days nothing but the tiny globoid bodies, single, in pairs, chains and clumps, could be found in the same tubes. These appear to be identical with those described by Flexner and Noguchi. After about three weeks the organisms become both larger and smaller; the small forms get beyond the limit of visibility, and nothing but rather large oval cocci staining a pinkish tint with the Giemsa stain are seen.

Transplants from one to another of these three liquid mediums disclose a marked tendency of the micro-organism to change to the form characteristic of the medium in which it is planted. Thus, an apparently pure culture of the very small globoid bodies in ascites tissue fluid when transferred to ascites-dextrose tissue broth grows out rapidly, often in twenty-four hours, into the characteristic polymorphous streptococcus. Similarly a transplant from broth to ascites fluid tends to grow slowly smaller.

Cultures of Berkefeld N filtrates of emulsions of brain and cord of rabbits dead from paralysis following intravenous injection with suspensions of broth cultures showing only the large forms have repeatedly grown out in this characteristic form in each of these three culture mediums. Cultures showing the small forms have been filtered, and cultures of the filtrate have grown, but no growth has been obtained from filtrates of cultures of the same strains showing only large forms. The same emulsions filtered through dense porcelain candles have, with one exception, always been sterile.

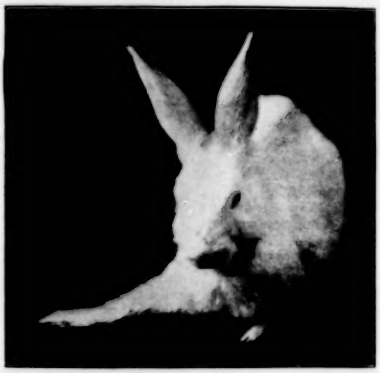

Fig. 3.—Rabbit 939, showing flaccid paralysis of right front leg, Aug. 11, 1916.

In all the liquid mediums during the early days of growth, chains are often found in which there are single members of all sizes and shapes — large diplococci, large coccus forms, small diplococci and small coccus forms. This has occurred in strains which have been fished successively several times from single colonies of shake and plate cultures, and in those from filtrates (Fig. 2).

The fermentative reactions of subcultures of a number of these strains have been tested. Two thirds of them fermented inulin; the remainder did not.

Paralysis with lesions in the central nervous system has been produced in guinea-pigs, rabbits, dogs, cats and monkeys by intravenous or intracerebral injection with this peculiar streptococcus from practically all of fifty-two cases of acute poliomyelitis. It has been produced by injecting the emulsions of pus expressed from the tonsils, emulsions of extirpated tonsils, and emulsions of the brain. It has followed injection of the primary mixed culture containing chiefly this peculiar streptococcus, and by injection of the pure cultures from throats, from the material expressed from tonsils, and from the abscesses in tonsils removed from living patients and necropsy cases. It has been produced consistently also with the pure cultures obtained from the brain and cord. While on aerobic cultivation and in dextrose-containing mediums the organism soon loses the power of causing paralysis, paralysis has been produced with strains in the third culture generation from successive single colonies.

Young animals were more susceptible, but the older ones were not always immune. While those which received large doses of culture often showed paralysis within thirty-six hours, the incubation period was usually from three to five days. The early paralyses were usually accompanied by evidences of pain in the affected extremity, and the animals so affected were apt to die within twenty-four hours of the onset, as the process extended rapidly and caused respiratory failure. The onset of later paralyses, especially in rabbits, was sometimes preceded by a fine tremor or even definite twitching of the muscles which later became flaccid. These animals appeared generally well, and took food normally. In most cases the paralyses spread and death occurred within two or three days. A number of animals, however, showed slow but definite improvement and did not die. One guinea-pig had a ptosis, and one monkey a seventh nerve paralysis, as initial symptoms. In some the reaction began with evidence of meningeal irritation which went on to general spasticity, convulsions and rapid death.

At necropsy the paralyzed animals showed congestion of the vessels of the meninges, and hemorrhagic edema surrounding the dura of the cord, especially anteriorly and extending along the nerve roots and ganglia. A majority had dilatation and fine hemorrhages in the gray matter of the cord and brain. The lymph glands commonly showed hyperemia and at times hemorrhage and edema. Animals which had ataxia and tremor usually showed areas of hemorrhagic infiltration of the cerebellum. There was a noteworthy freedom of lesions in other organs. Microscopic sections have not yet been examined in sufficient numbers to warrant a definite report, but those examined (from rabbits, guinea-pigs and monkeys) showed small hemorrhages, degeneration of nerve cells, some round-cell infiltration and neurophagocytosis.

The organism has been isolated in pure culture and often in large numbers from the nervous tissue in numerous animals injected with cultures when blood and other tissues were sterile or contained the organism in smaller numbers. It has been demonstrated microscopically in and adjacent to the lesions in the brain and cord. In animals in which paralysis occurred early and which died soon after injections of large doses, the large forms only have thus far been found,

while in those which died after a long period of incubation, both large and small forms have been demonstrated.

We have isolated the same organism from brain and cord of paralyzed monkeys injected intracerebrally with fresh emulsions of brain and cord from human poliomyelitis (fresh human virus), with glycerinated human virus and glycerinated monkey virus.[8]

Fig. 4.—Rabbit 939, sections of Kaiserling specimen of cord, × 2. From above downward, Sections 1, 2, 3, 4 and 5 are cervical cord; Sections 6 and 7 dorsal cord; Section 8 lumbar cord. Note hemorrhages in gray matter, chiefly in anterior horns.

ILLUSTRATIVE EXPERIMENTS

Case 686.—S. A., boy, aged 5 years, complained of stiff neck, July 18. July 20, he had a temperature of 102. When seen with Dr. Sheldon in the Mayo Clinic, July 21, there was weakness of the left shoulder and arm, and flaccid paralysis of the left deltoid, triceps and scapular muscles. The left grip was weaker than the right; the fingers moved slowly, and there was evidence of extensor weakness. No reflexes could be obtained in the left arm.

From the left tonsil there was expressed a soft greenish plug, about 1.5 by 2.5 mm., and from both tonsils a rather large amount of liquid pus was obtained.

The material expressed from the tonsils was emulsified in 2 c.c. of salt solution, and cultures and animal injections were made. One series of rabbits and guinea-pigs was injected immediately with the emulsion of the tonsil pus, and another series, July 22, with the cultures.

Eighteen-hour cultures of the tonsil pus gave the following results:

1. Blood agar plate showed enormous numbers of very fine, dry, green-producing streptococcus colonies, some of which were surrounded by a narrow zone of hazy hemolysis, and a few colonies of staphylococcus and *Micrococcus catarrhalis.*

2. Ascites-dextrose broth (tubes and bottles) showed apparently pure cultures of streptococci in short and medium long chains and in pairs. Some of the diplococci were large and lanceolate in shape, resembling pneumococci, and others were small and more coccus-like. Both large and small forms were found in the same chain.

In all, injections were made into thirteen animals—seven rabbits, five guinea-pigs and one dog. Of these, the dog and all but one of each of the rabbits and guinea-pigs showed either evidence of paralysis during life or lesions of the brain and cord after death. The following three protocols illustrate the results obtained:

Rabbit 930.—Weight, 690 gm. July 21, injection of 0.5 c.c. of sodium chlorid emulsion of tonsil pus 686, the organisms of which appeared on blood agar plates as fine, green-producing streptococci, slightly hemolytic streptococci, staphylococci and *Micrococcus catarrhalis,* were made into the cerebrum. The animal was found dead eighteen hours later. Necropsy revealed lesions of skeletal and heart muscles but no external abnormality of brain or cord. Cultures of the blood were sterile. Ascites-dextrose broth and blood agar plate cultures of the spinal cord showed pure cultures of streptococci, appearing as fine, dry, green colonies on the plate. In sections of the brain and cord after hardening, seven small hemorrhages were found in the gray matter of the cord and two larger hemorrhages in the anterior portion of the medulla. Microscopically, these areas showed hemorrhage, slight round-cell infiltration and diplococci and streptococci in the vicinity of the hemorrhagic areas.

Rabbit 936.—Weight, 1,040 gm. Injected intravenously, July 24, with a growth from 30 c.c. of ascites-dextrose broth suspended in 2 c.c. sodium chlorid solution of the spinal cord of Rabbit 930. Blood agar plates of the culture injected showed fine, dry, green-producing streptococcus colonies in pure culture. The rabbit was found dead the next morning. Necropsy showed no focal lesions. Ascites-dextrose broth culture of blood gave an apparently pure culture of streptococci in pairs and short chains. Blood agar plate of blood showed a pure culture of very small, dry, green-producing streptococcus colonies, a few of which were surrounded by a narrow, hazy zone of hemolysis.

Rabbit 939.—Weight, 1,160 gm. Injected intravenously, July 26, with 5 c.c. of an ascites-dextrose broth culture of the blood of Rabbit 936. The animal seemed perfectly well up to August 11, sixteen days after the injection, when at 11 a. m. it showed flaccid paralysis of the right front leg, which lay stretched out and could not be brought under the body (Fig. 3). Otherwise he seemed well, and took food normally. At 3 p. m. the left front leg was also weak, and he was unable to lift the thorax from the floor. At 4 p. m. respiration became shallow, irregular and labored; there was evidence of meningeal and cerebral involvement (retraction of head and convulsions). Death occurred at 5 p. m. Necropsy showed no gross lesions. August 12, the spinal cord and fluid incubated over night showed diplococci, short chains and clumps of streptococci. The individual organisms in chains showed marked difference in size, varying from approximately one fourth that of a pneumococcus to the full size of a pneumococcus. Cross sections of the cord after fixation in Kaiserling I for twenty-four hours showed diffuse hyperemia of the gray matter throughout, and areas of hemorrhage in the gray matter which were most marked in the cervical region (Fig. 4). Microscopic sections of all portions of the cord showed many small and medium-sized areas of hemorrhage in the gray matter, especially in the anterior horns. Moderate round-cell infiltration was noted throughout the gray matter. The ganglion cells, particularly of the anterior horns in the cervical region, showed marked degeneration and neurophagocytosis. In the intervertebral ganglia, there was degeneration and phagocytosis of the ganglion cells, and moderate lymphocytic infiltration. Gram stains of sections of the cord showed rather small gram-positive diplococci, single and in short chains. In several areas of hemorrhage showing deposit of blood pigment, there were found large numbers of cocci, some in pairs and chains, showing marked variation in size (Fig. 5).

Fig. 5.—Photomicrograph of streptococcic forms in area of hemorrhage in the posterior horn of cervical cord of Rabbit 939. Note the marked variation in size of the organisms, large and small diplococci scattered throughout the field, and exceedingly small forms in the short chains to the left of the center. The dark, irregular areas to the left are deposits of blood pigment. Gram-Weigert; × 1,000.

Case 714.—Monkey 12 (*Macacus rhesus*) was injected intravenously, September 9, with suspensions in salt solution of the growth from 30 c.c. of ascites dextrose and 30 c.c. of plain broth, mixed, obtained from the brain of Rabbit 1017 in pure culture. This organism formed characteristic fine, dry, green colonies on blood agar plate and appeared as an ordinary-sized streptococcus in broth. The strain came from the emulsions of brain in a case of poliomyelitis in which the necropsy was held, August 24, and had passed in pure culture of large forms through three rabbits in succession. Each rabbit had shown marked flaccid paralysis after from

8. Kindly sent us by Dr. G. W. McCoy of the U. S. Public Health Service, Washington, D. C.

three to seven days with gross and microscopic lesions quite similar to those described above for Rabbit 939.

September 11, the left arm was weak; slight wrist drop and poor grip. The animal took food normally and seemed well.

September 12, condition of arm was stationary, or perhaps improved a little. The animal was injected intravenously with the growth from 30 c.c. of the same culture, which in the meantime had been in the ice box, and showed the same growth in subculture on plate and in broth.

September 14, both arms were weak. The animal was irritable and excited.

September 15, the animal was quiet and inclined to lie down; it got on its haunches with great difficulty.

September 16, complete wrist drop was shown on left, flaccid paralysis of left triceps and deltoid, weakness of back muscles, and coarse tremor of right triceps and extensors of thighs. The animal ate well if food was put where he could reach it with his head. This condition went on to complete flaccid paralysis of all muscles of extremities and body; respiration became irregular, labored and entirely diaphragmatic. Marked cyanosis. At 7:30 p. m., the animal was almost dead; he was chloroformed, and examined at necropsy at once.

Cross sections of the cord showed hyperemia of the gray matter with areas of hemorrhagic infiltration, more marked in anterior horns and about the central canal. There were no other gross lesions. Cultures of the brain and cord gave the usual polymorphous streptococcus in pure culture in almost every tube. Microscopic sections of the cord (Fig. 6) showed numerous hemorrhages in the gray matter, with degeneration of the ganglion cells of the anterior horns. There was moderate infiltration with lymphocytes, and neuronophagia. Diplococci were demonstrated in the tissues.

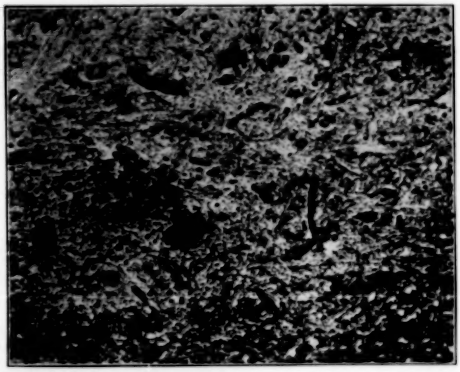

Fig. 6.—Photomicrograph of cross section of anterior horn of cervical cord of Monkey 12. Note the marked dilatation of vessels, the hemorrhage, the degeneration of ganglion cells, and round-cell infiltration with neuronophagia. Hemotoxylin and eosin; × 140.

SUMMARY

We have isolated a peculiar streptococcus from throats, tonsils, abscesses in tonsils and from the central nervous system in cases of poliomyelitis. Paralysis has been produced in animals of various species by intravenous and intracerebral injection of cultures of this organism, and lesions of the gray matter of their nervous system have been demonstrated. From the nervous system of these animals the streptococcus has been isolated in pure culture, while their other tissues were sterile; it is remarkably polymorphous, and appears to grow large or small according to the medium in which it is grown, even after passage through a Berkefeld filter.

Using the organism in its large form, paralysis has been consistently produced in animals known to be insusceptible to inoculation with material from epidemic poliomyelitis as heretofore practiced. After paralysis had been produced in a series of three rabbits, the strain caused characteristic paralysis and lesions of poliomyelitis in monkeys.

The exact relation of our results to the facts already established as to the etiology of poliomyelitis cannot yet be definitely stated. It appears to us that the small, filterable organism which has been generally accepted as the cause of poliomyelitis may be the form which this streptococcus tends to take under anaerobic conditions in the central nervous system and in suitable culture mediums, while the larger and more typically streptococcic forms, which investigators have considered contaminations, may be the identical organism grown larger under suitable conditions.

The Mayo Foundation—Peter Bent Brigham Hospital—New York Hospital.

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EXPERIMENTAL STUDIES IN THE ETIOLOGY OF ACUTE EPIDEMIC POLIOMYELITIS *

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For several years it has appeared that the etiology of acute epidemic poliomyelitis has been successfully cleared up by the work of Landsteiner and Popper[1] and by that of Flexner[2] and his co-workers, Lewis, Noguchi and others. Landsteiner and Popper in 1908 first succeeded in transferring the disease to various species of monkeys by intraperitoneal inoculation of human poliomyelitic brain and cord. They were able to produce a disease in the monkey which in its clinical, pathologic and histologic features was quite similar to acute poliomyelitis in man. According to these workers, mice, rats, guineapigs, dogs, cats, goats, sheep and horses proved refractile to the disease.

Many conflicting statements occur in the literature as to whether or not the virus of poliomyelitis can be transmitted to the rabbit. Krause and Meinicke assert that they have produced the disease in seven generations of rabbits, and more recently Rosenau and Havens[3] have successfully passed the virus of the disease through eight generations of young rabbits.

Flexner and Noguchi have been able to obtain the filterable virus in pure culture, employing the anaerobic ascitic fluid culture medium, to which a sterile piece of rabbit's kidney is added.

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1. Landsteiner and Popper: Uebertragung der Poliomyelitis acuta auf Affen, Ztschr. f. Immunitätsforsch., 1909.
2. Flexner and Noguchi: Jour. Exper. Med., 1913, xviii, 461.
3. Rosenau and Havens: Jour. Exper. Med., April, 1916.

SOURCE OF MATERIAL

During the recent epidemic of poliomyelitis, nearly all cases of the disease in Chicago were isolated in a special ward in the Cook County Hospital. There has been a relatively large number of fatal cases, indicating that the infecting micro-organism is of unusually high virulence. Necropsies have been performed on a considerable number of these fatal cases, and the brain, spinal cord, tonsils, mesenteric lymph glands, and body

Fig. 1.—Complete flaccid paralysis produced seventy-two hours after the injection of 1 c.c. of an aerobic culture from a human poliomyelitic brain. Intraperitoneal injection.

fluids have been removed under sterile precautions very shortly after death and while the bodies were still warm. Cultures were made immediately from the brain and spinal cord in various mediums. The central nervous tissues were then preserved in 50 per cent. sterile glycerin for future use.

RESULTS OF CULTIVATION

From cultures of the brain and cord in nine different cases examined a gram-positive micrococcus was obtained in pure culture. In one case the *B. subtilis* was present as a contamination. Aerobic and anaerobic cultures were regularly made from small pieces of the human brain and spinal cord inoculated into sterile ascites fluid, ascites dextrose broth, and ascites fluid to which a small piece of sterile rabbit's kidney was added. The cultures were placed in the incubator at 35 C. (95 F.) for from one to ten days.

In the aerobic cultures, bacterial growth usually appeared at the end of twenty-four hours as a fine granular grayish precipitate along the side of the test tube, rapidly settling to the bottom of the tube to form a heavy white sediment. In anaerobic cultures made according to the method of Flexner and Noguchi, bacterial growth is slow. Usually after four or five days — often as long as seven — a scanty growth first manifests itself as an opalescence arising around the tissue fragments in the bottom of the test tube and gradually ascending upward in the medium. Later a fine granular precipitate forms which falls to the bottom of the culture tube.

Morphologically the micro-organism, when grown aerobically, is a gram-positive micrococcus arranged in pairs and tetrads chiefly, but also appearing in short chains of from three to five. It presents essentially a diplococcus arrangement. In anaerobic cultures and in the human ascitic fluid mediums to which a sterile piece of rabbit's kidney is added, growth is scanty and the organism appears in a much smaller form; at the end of two or three days it has been repeatedly observed as a very minute micrococcus and barely visible under the oil immersion lens. It stains by Gram's method and appears in pairs, short chains of from three to five, and in small clumps. After from five to seven days' growth under anaerobic conditions, it often closely approximates in size an early twenty-four hour growth of the micrococcus grown aerobically.

On blood agar plates the organism appears at the end of forty-eight hours as a pin point colony surrounded by a narrow zone of hemolysis and often exhibiting a slight greenish color. When a growth has once been obtained, subcultures grow rather luxuriantly on the usual cultural mediums. It ferments the saccharids with the exception of inulin and raffinose. Gelatin is liquefied at room temperature. The thermal death point of the micro-organism has been found to be an exposure of 55 C. (131 F.) for thirty minutes. It stains with varying intensity with the anilin dyes.

From the cerebrospinal fluid obtained by lumbar puncture from patients suffering from acute poliomyelitis, the same gram-positive diplococcus arranged in pairs and short chains has been isolated in pure culture in eight out of nine cases after cultivation aerobically on ascites dextrose broth to which a fragment of sterile rabbit's kidney has been added. Moreover, it has been possible in several instances to isolate from the crypts of the tonsils and from the tonsils and mesenteric lymph glands secured at necropsy an organism presenting the morphologic characteristics described above which, when injected into animals intraperitoneally, has produced both the clinical and microscopic changes which characterize acute poliomyelitis.

That the micro-organism resists glycerinization has been proved in at least one instance. It has been pos-

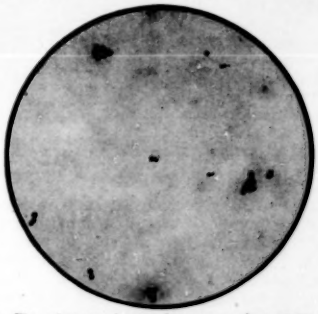

Fig. 2.—The micro-organism as it appears when grown for from seven to ten days anaerobically.

sible to obtain a pure culture of the micrococcus from the brain and cord in a human case of the disease after a period of thirty-five days' preservation in sterile 50 per cent. glycerin.

ANIMAL INOCULATIONS

Thus far we have inoculated intraperitoneally, intracerebrally, intravenously, and by nasal insufflation a series of fifty rabbits. The cultures utilized for these animal inoculations were obtained from the brain and

spinal cord and the mesenteric lymph glands in fatal human cases, and also from the tonsil crypts and in a few instances from tonsil abscess pockets of patients sick with the disease. In a considerable number of the animals it has been possible to produce a most striking type of progressive flaccid paralysis involving both hind limbs, the front legs, only one leg, or in three cases all four legs. The animals rapidly emaciate and usually die within from one to three days after the onset of a progressive paralysis. Others recover

Fig. 3.—Usual arrangement of the micrococcus when cultured aerobically.

entirely, and many are apparently not affected even by repeated injections. Examples of successful rabbit inoculations follow:

CASE 1 (P IV).—*History.*—Small white rabbit, blue cross on nose. Sept. 9, 1916, intraperitoneal injection of 1 c.c. of a four day human culture from the medulla of fatal case A.

Sept. 12, 1916, complete flaccid paralysis of both hind legs. Animal drags hind legs when it attempts to crawl along. 11 a. m., animal prostrate with head drawn back and rapid respirations. Death.

Necropsy.—Peritoneum smooth and glistening. No free fluid. No gross changes in the abdominal or thoracic viscera. Marked hyperemia of the pia-arachnoid membranes over the cerebral cortex. Spinal cord hyperemic and edematous.

Microscopic Examination.—Serial sections through the lumbar level of the spinal cord and the medulla reveal a marked degeneration of the motor ganglion cells. Marked satellitosis. Congestion of the vessels in cross section with scattered areas of punctate hemorrhages. Marked interstitial infiltration of the gray matter. No perivascular infiltration.

Bacterial Stain.—Serial sections of the medulla stained with eosin-methylene blue. A minute diplococcus also in occasional short chains visible in the gray matter of the cord.

Cultural Examination.—Cultures yield a pure growth of a gram-positive organism similar in all respects to the original micrococcus injected.

CASE 2 (P XXI).—*History.*—Small brown rabbit. Sept. 15, 1916, 12 p. m., intraperitoneal injection of 3 c.c. of culture of the tonsils of G.

September 17, animal is thin and emaciated. Active.

September 21, 8 a. m., rabbit has a marked flaccid paralysis of both front feet. Unable to move front legs; 9 a. m., complete paralysis of the neck muscles and animal is unable to raise its head. Death at 10 a. m.

Necropsy.—Marked hyperplasia of the spleen and mesenteric lymph glands. Moderate hyperemia of the pia-arachnoid membranes over the cerebral cortex and about the brain stem.

Microscopic Examination.—Marked degeneration of the ganglion cells in the cervical level of the cord. Also degeneration seen in the medulla. Neuronophagia marked. Punctate hemorrhages and an interstitial infiltration of the gray matter.

From a careful study of these rabbit inoculations it seems fair to conclude that the organism isolated in the cases of the disease can give rise to a flaccid paralysis in rabbits which resembles acute poliomyelitis clinically, but histologically differs from the human in that no perivascular infiltration is present and that the types of infiltrating cells are probably not lymphocytes.

Moreover, the organism is of low virulence for rabbits and guinea-pigs. The elective affinity of the organism for the brain and spinal cord of rabbits does not apparently increase by animal passage. The incubation period varies from thirty hours to fourteen days. The micro-organism shows no tendency to produce a meningitis or peritonitis in rabbits.

Thus far we have been able to produce a flaccid paralysis of both hind legs in young dogs by an intracerebral injection of a small dose of the micro-organism as isolated from human brains. The paralysis has been attended by a persistent diarrhea and marked emaciation in one dog. None of these animals has succumbed as yet.

Repeated injections of this micrococcus into guinea-pigs have thus far failed to produce any paralysis. In the monkey it has been possible to produce typical acute poliomyelitis even with relatively old cultures of the micro-organism. An example follows:

CASE 3 (M IV).—Sept. 28, 1916, small ringtailed monkey etherized and head and abdomen shaved and sterilized. Intraperitoneal injection of a mixture of five strains of the micro-organism isolated in aerobic cultures from the brains of five human patients, namely, Cases A, G1, B, W, and Du. Also 0.5 c.c. of foregoing mixed culture injected into the left frontal cerebral region after trephining the skull.

September 28, 6 p. m., animal has recovered from the anesthesia, and no postoperative paralysis is present.

September 30, 8 a. m., monkey very quiet and drowsy in the cage. Greenish yellow nasal discharge. Monkey is weak, and careful examination reveals a complete flaccid paralysis of the right upper arm and a marked spastic paralysis of

Fig. 4.—Contact smear made from the cerebrum of the monkey dying of acute poliomyelitis. Ingestion of the micrococcus by the leukocytes.

the right hind leg. Palm of right front leg is cold. Involuntaries.

September 30, 6 p. m., monkey prostrate; death.

Necropsy.—Abdominal and thoracic viscera negative except for two small tuberculous ulcers of the distal ileum and several small conglomerate tubercles in the left lung. Marked hyperemia of the pia-arachnoid membranes over the cerebral cortex. Edema of the cord and minute visible hemorrhages in the substance of the cord. At the site of inoculation there is a small blood cyst. Contact smears from the surface of the cerebrum yield many minute diplococci, some ingested by the leukocytes.

Microscopic Examination.—Typical acute poliomyelitis. Marked degeneration of the ganglion cells with perivascular and interstitial lymphocytic infiltration of the gray matter of the cord and brain. Neuronophagia prominent in the intervertebral ganglia.

In 1905 Geirsvold,[4] in a preliminary communication, stated that he had successfully isolated from the cerebrospinal fluid in twelve acute cases of poliomyelitis a gram-positive coccus, occurring in pairs, short chains and tetrads. He stated that he was able to make cultures of this micro-organism on a variety of mediums and further that he was able to produce definite paralysis in white mice, rabbits and pigeons. No histologic report was made regarding the central nervous system of these paralyzed animals.

It is not at all improbable that the organism described by us is identical with the micro-organism isolated by Mathers[5] from the brain and spinal cord in acute fatal cases. This would seem the more probable since the brains and cords obtained at the postmortem examinations were in a number of instances divided equally between us for cultural study, although the work has been done independently by each of us.

Landsteiner and Popper, and, working independently, Flexner and Lewis determined that the virus of poliomyelitis passes through a Berkefeld filter. In at least two instances we have been able to pass an aerobic culture of poliomyelitic brain through a Berkefeld filter V, and by making a culture of the filtrate on dextrose ascites broth containing a sterile rabbit's kidney, we were able to obtain a pure culture of the micrococcus described above.

SUMMARY

1. We have obtained from the postmortem material in typical cases of poliomyelitis, from tissues of the central nervous system, tonsils and mesenteric glands, and from the cerebrospinal fluid obtained by lumbar puncture during life, a gram-positive micrococcus which grows well on dextrose ascites broth to which a sterile piece of rabbit's kidney has been added — but always better aerobically than anaerobically.

2. Cultures of this organism, when injected into monkeys, produced the typical clinical and pathologic picture of acute poliomyelitis. Definite flaccid paralysis has been produced in dogs and in many young rabbits. In rabbits, however, as others have pointed out before us, there is a variation in the microscopic picture, although many of the changes attendant on the disease in man and monkeys are present in the central nervous system of the rabbit following paralysis.

3. Anaerobic cultures in fluid mediums were passed through Berkefeld filters V, and inoculations of the filtrate into suitable mediums produced a growth of the larger form of the organism seen in aerobic cultures. This would seem to indicate that the organism under anaerobic conditions assumes a form so small that it may pass through the Berkefeld filter. The virus of rabies, as is well known, presents itself in a large form, the Negri bodies, and in the small punctiform granules which can evidently pass the filter. In considering the gram-positive coccus in its etiologic relation to acute poliomyelitis, we must remember that it may act as a carrier of a real ultramicroscopic invisible virus which, together with this micrococcus, might still be transferred in the cultures and passed along in the inoculations.

4. In tissues from the central nervous system of poliomyelitic material preserved in 50 per cent. sterile glycerin, this same micrococcus was alive after a period of thirty-five days, and could be cultivated in pure culture on suitable mediums.

4. Geirsvold, M.: Norsk Mag. f. Lægevidensk., 1905, iii, 1280.
5. Mathers, George: Some Bacteriologic Observations on Epidemic Poliomyelitis, THE JOURNAL A. M. A., Sept. 30, 1916, p. 1019.

A NEW INSTRUMENT FOR THE CLINICAL MEASUREMENT OF DARK ADAPTATION *

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The measurement of the dark adaptation of the eye has usually been confined to laboratory observers because of the time such an examination requires and because of the complexity of the instruments used. Consequently, valuable clinical information has frequently been overlooked. To simplify this examination, I devised an instrument for clinical use and adopted an empiric standard of dark adaptation units.

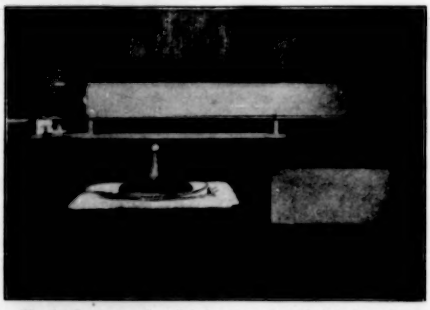

Fig. 1.—Instrument for clinical measurement of dark adaptation.

The instrument consists of a standard, on which is mounted a light-proof box, exactly 1 meter long and 12 cm. high and wide (Fig. 1). At one end is an open eye piece, so shaped as closely to approximate the orbital rim (Fig. 2 *A*). At the other end of the box is an iris diaphragm, *E*, whose diameter can be varied from 1 to 15 millimeters. Two and five-tenths cm. beyond this is another iris diaphragm, *F*, with an opening ranging from 10 to 25 mm. in diameter. This diaphragm is in a black chimney covering a 50 watt, 110 volt, carbon-filament lamp, that is controlled by the rheostat, *H*. In the exact center of the box is a steel plate, *B*, out of the middle of which is cut a cross, 4 cm. in size, with arms 4 mm. wide. Behind it is an opal glass plate, *C*, and at the end of the box, a ground glass plate, *D*, both for the purpose of diffusing the light.

For a clinical examination of dark adaptation, the patient is seated for five minutes in the dark room, which is illuminated by three 60 watt tungsten lamps. This is for the purpose of bringing all eyes to as near a uniform state of adaptation as possible. The lights are then turned out and the patient is seated before the instrument with the eye to be examined applied to the eye piece and the other eye closed. The iris diaphragm, *E*, is closed as far as possible, and the light diaphragm, *F*, set at a predetermined point, 10, 15, 20, or 25 mm. The rheostat is set at the least measurable resistance.

* Read before the Section on Ophthalmology at the Sixty-Seventh Annual Session of the American Medical Association, Detroit, June, 1916.

The patient is instructed to exclaim as soon as the cross becomes visible. As nearly every one is more or less astigmatic, the complete cross will not come into view immediately, but one or the other arms will appear first and then be followed by the entire cross. The iris diaphragm is gradually opened until this point is reached. Notation is then made of the diameter of the iris diaphragm and the light diaphragm and of the number of ohms resistance introduced by the rheostat. The measurement is repeated every five minutes, the intensity of the illumination being gradually decreased by increasing the number of ohms resistance introduced.

TABLE 1.—DARK ADAPTATION UNITS AT 68 OHMS RESISTANCE

Iris Diaphragm	Light Diaphragms 25	20	15	10
15.0	187	226	302	453
14.5	190	234	313	469
14.0	194	242	324	486
13.5	201	250	336	505
13.0	208	261	349	524
12.5	217	273	363	546
12.0	226	283	378	567
11.5	238	296	394	592
11.0	247	309	410	618
10.5	260	325	431	649
10.0	272	340	453	680
9.5	287	350	478	718
9.0	303	378	504	756
8.5	321	401	535	803
8.0	340	425	567	850
7.5	365	446	610	911
7.0	397	486	654	972
6.5	325	527	704	1,051
6.0	453	567	755	1,131
5.5	611	625	803	1,250
5.0	569	680	906	1,360
4.5	604	765	1,019	1,530
4.0	680	850	1,133	1,700
3.5	915	974	1,322	1,983
3.0	950	1,139	1,511	2,266
2.5	1,105	1,417	1,866	2,833
2.0	1,360	1,700	2,222	3,400
1.5	2,040	2,550	3,383	5,100
1.0	2,720	3,400	4,544	6,800

TABLE 2.—DARK ADAPTATION UNITS AT 136 OHMS RESISTANCE

Iris Diaphragm	Light Diaphragms 25	20	15	10
15.0	363	453	604	906
14.5	375	469	625	938
14.0	388	486	647	971
13.5	408	504	672	1,008
13.0	419	523	697	1,046
12.5	431	545	726	1,089
12.0	453	567	755	1,133
11.5	474	592	789	1,184
11.0	495	617	824	1,236
10.5	519	648	865	1,298
10.0	544	680	906	1,360
9.5	574	717	956	1,435
9.0	604	755	1,007	1,511
8.5	642	802	1,070	1,618
8.0	680	850	1,133	1,725
7.5	728	910	1,214	1,833
7.0	777	971	1,295	1,942
6.5	842	1,052	1,403	2,104
6.0	907	1,133	1,511	2,266
5.5	992	1,245	1,662	2,543
5.0	1,077	1,360	1,813	2,720
4.5	1,198	1,530	2,039	3,060
4.0	1,360	1,700	2,266	3,400
3.5	1,587	1,983	2,644	3,966
3.0	1,814	2,266	3,022	4,533
2.5	2,267	2,611	3,777	5,666
2.0	2,720	2,956	4,533	6,880
1.5	4,080	4,878	6,799	10,200
1.0	5,440	6,800	9,066	13,600

The calculation of the dark adaptation units is empiric, and is dependent entirely on the construction of the instrument. The number of ohms resistance divided by the diameter of the iris diaphragm, *E*, multiplied by the diameter of the light diaphragm, *F*, gives an empiric standard. To simplify this computation, I compiled the tables for the various conditions (Tables 1-5).

I do not intend in this article to discuss the various phases of normal and abnormal dark adaptation, but shall merely present a composite normal curve of adaptation (Fig. 3). This begins between 1,200 and

TABLE 3.—DARK ADAPTATION UNITS AT 204 OHMS RESISTANCE

Iris Diaphragm	Light Diaphragms 25	20	15	10
15.0	544	680	906	1,360
14.5	563	704	939	1,408
14.0	582	729	972	1,457
13.5	604	757	1,009	1,513
13.0	627	786	1,046	1,569
12.5	653	818	1,089	1,634
12.0	680	850	1,133	1,700
11.5	710	888	1,184	1,777
11.0	741	927	1,236	1,854
10.5	778	973	1,298	1,947
10.0	816	1,020	1,360	2,040
9.5	861	1,076	1,435	2,153
9.0	906	1,133	1,511	2,266
8.5	963	1,204	1,605	2,408
8.0	1,020	1,275	1,700	2,550
7.5	1,092	1,365	1,821	2,732
7.0	1,165	1,456	1,943	2,914
6.5	1,262	1,578	2,004	3,157
6.0	1,360	1,700	2,266	3,400
5.5	1,496	1,870	2,493	3,740
5.0	1,632	2,040	2,720	4,080
4.5	1,836	2,295	3,060	4,590
4.0	2,040	2,550	3,400	5,100
3.5	2,380	2,975	3,967	5,950
3.0	2,720	3,400	4,534	6,800
2.5	3,400	3,750	8,377	8,500
2.0	4,080	5,100	6,800	10,200
1.5	6,120	7,650	10,200	15,300
1.0	8,160	10,200	13,600	10,400

TABLE 4.—DARK ADAPTATION UNITS AT 272 OHMS RESISTANCE

Iris Diaphragm	Light Diaphragms 25	20	15	10
15.0	725	906	1,208	1,813
14.5	751	940	1,241	1,877
14.0	777	971	1,295	1,942
13.5	806	1,008	1,345	2,017
13.0	836	1,046	1,395	2,092
12.5	871	1,089	1,453	2,179
12.0	906	1,133	1,546	2,266
11.5	947	1,184	1,616	2,369
11.0	989	1,236	1,648	2,472
10.5	1,038	1,298	1,730	2,596
10.0	1,088	1,360	1,813	2,720
9.5	1,140	1,435	1,914	2,871
9.0	1,208	1,511	2,015	3,022
8.5	1,284	1,605	2,140	3,212
8.0	1,360	1,700	2,266	3,403
7.5	1,457	1,821	2,428	3,642
7.0	1,554	1,942	2,590	3,885
6.5	1,673	2,104	2,806	4,209
6.0	1,813	2,266	3,022	4,533
5.5	1,994	2,493	3,324	4,986
5.0	2,176	2,720	3,627	5,440
4.5	2,448	3,060	4,080	6,120
4.0	2,720	3,400	4,534	6,800
3.5	3,173	3,966	5,789	7,933
3.0	3,626	4,533	6,045	9,066
2.5	4,533	5,666	7,559	11,333
2.0	5,440	6,800	9,073	13,600
1.5	8,160	10,200	13,601	20,400
1.0	10,880	13,600	18,130	27,200

TABLE 5.—DARK ADAPTATION UNITS AT 340 OHMS RESISTANCE

Iris Diaphragm	Light Diaphragms 25	20	15	10
15.0	918	1,133	1,511	2,266
14.5	944	1,173	1,562	2,347
14.0	971	1,214	1,614	2,428
13.5	1,005	1,260	1,678	2,521
13.0	1,040	1,307	1,743	2,625
12.5	1,086	1,361	1,815	2,719
12.0	1,133	1,416	1,888	2,833
11.5	1,187	1,480	1,974	2,961
11.0	1,241	1,544	2,060	3,090
10.5	1,300	1,622	2,163	3,245
10.0	1,360	1,700	2,266	3,400
9.5	1,435	1,794	2,392	3,588
9.0	1,511	1,888	2,519	3,777
8.5	1,605	1,996	2,676	4,013
8.0	1,700	2,124	2,833	4,250
7.5	1,821	2,276	3,035	4,553
7.0	1,942	2,428	3,238	4,857
6.5	2,104	2,630	3,507	5,261
6.0	2,266	2,833	3,777	5,666
5.5	2,533	3,116	4,155	6,233
5.0	2,800	3,400	4,533	6,800
4.5	3,100	3,825	5,099	7,650
4.0	3,400	4,250	5,666	8,500
3.5	3,966	4,958	6,610	10,916
3.0	4,533	5,666	7,555	11,333
2.5	5,666	7,083	9,444	14,166
2.0	6,800	8,500	11,333	17,000
1.5	10,200	12,750	16,999	25,500
1.0	13,600	17,000	22,666	34,000

1,500 units, and increases very rapidly for about half an hour. The increase then becomes more gradual, and after about two hours, maximum adaptation is attained. But only in exceptional cases is it necessary to carry out the measurement for this length of time, half an hour usually sufficing. A word of caution should be added. Measurements must not be made too near together, as the persistence of after-images will vitiate the results.

Despite the fact that I intend to reserve discussion of dark adaptation in various pathologic conditions for

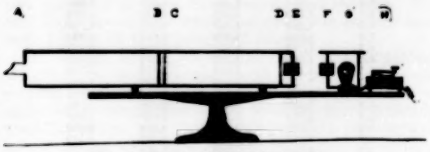

Fig. 2.—Sectional view of instrument.

a future communication, I feel impelled to speak of the value of the measure of this function as the measure of the comparative density of a corneal scar. This is so self-explanatory that I will not go into details, but merely will present two charts representing such conditions. Figure 4 shows the curve of dark adaptation of a young man whose right cornea was rather densely scarred during the course of a severe iridocyclitis. The vision in that eye is merely finger counting at several feet. Figure 5 represents the dark

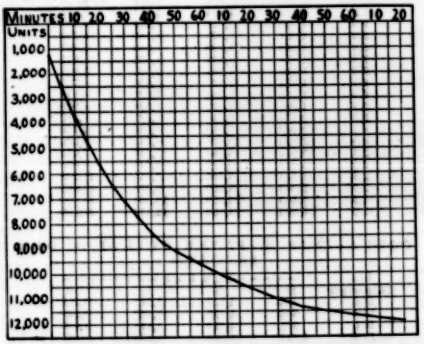

Fig. 3.—Composite normal curve of adaptation.

adaptation of an older man shortly after a long and severe attack of herpes zoster corneae in the left eye, with a resultant vision of only 0.3.

32 North State Street.

ABSTRACT OF DISCUSSION

Dr. Edward Augustus Willis, Indianapolis: Dr. Gradle's instrument may become of great value ultimately. It will require many changes, however, before it can be used to distinct clinical advantage. For some time I have been endeavoring to have an optical firm make an instrument with which I could measure light perception. As you know, for years we have been satisfied to measure in our patients the perception of the form, size and color of objects, but we have neglected tests of ability to perceive certain definite amounts of light. Therefore, the question of the perception of light and its value and importance in various diseases probably has not entered into the consideration of many men in their diagnosis and treatment of disease. Although this instrument seems to be an opening wedge in determining light tests, I believe from its mechanical arrangement that it is not absolutely adequate for the work intended, because, in the first place, with a rheostat of this sort, even with two iris diaphragms, it is necessary in going from one point of the

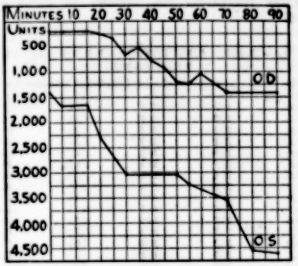

Fig. 4.—Curve of dark adaptation in W. H., a patient with macula corneae in right eye.

rheostat to another to have a certain lapse in the amount of light available to the patient's eye. Further, instead of having one screen through which to allow the light to pass to give a definite image, there should be several screens, because if a person has one eye examined he will then anticipate the form and light perception through a known screen. Further, instead of having a definite form of light there should be a diffuse light. How that can be accomplished I am not prepared to say. But it seems to me that Dr. Gradle has suggested something of enormous importance, particularly in view of the fact that so much work now is being done with colored lenses, which of course has its foundation in the proper appreciation of light.

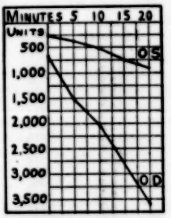

Fig. 5.—Curve of dark adaptation in D. J. E., a patient with macula corneae in left eye.

Dr. Walter B. Lancaster, Boston: Will Dr. Gradle tell us how he measures the strength of light in intensity?

Dr. H. S. Gradle: I do not endeavor to measure the intensity of light; all I do is to introduce a definite varying number of ohms of resistance into the circuit. The street current is fairly uniform and the deterioration of a 50 watt carbon lamp is minimized.

Dr. Walter B. Lancaster: Do you use the street current?

Dr. H. S. Gradle: Yes.

Increase in Street Accidents.—The National Highways Protective Association reports that during the month of September sixty-nine persons were killed on the streets of New York, thirty-six of whom were children under the age of 16 years. Automobiles caused the death of fifty-three persons, the largest number ever recorded during one month. Trolleys killed five and wagons eleven. On the streets and highways of New York State, during the same period, automobiles caused the death of forty-one persons and trolleys one. The report for the first nine months of the year shows that 543 persons have been killed by automobiles on the highways of the state, including New York, while during the same period of last year there were 476 fatalities due to this cause.

IMMUNE HUMAN SERUM IN THE TREATMENT OF ACUTE POLIOMYELITIS *

C. W. WELLS, M.D.
CHICAGO

The question of the treatment of acute poliomyelitis has acquired special interest during the past few months because of the prevalence of the disease in the United States. While the administration of serum of persons who have had the disease has been suggested, still the number of cases so treated is so few as to warrant a brief report of the results in fifteen cases.

It is held that poliomyelitis is infectious. The changes in the central nervous system and its appendages, as well as elsewhere, appear to be of microbic origin, and the resulting edema and hemorrhage produce pressure sufficient to cause paralysis. Whatever the underlying mechanism of the process may be, resort to a treatment based on the accepted principles of immunity appears worthy of trial, and such treatment seems to be available, since human immune serum has been found to contain principles capable both of neutralizing the so-called virus of poliomyelitis, and of furnishing protection for animals against inoculation of the virus.[1] The first use of immune human serum in acute poliomyelitis was reported by Netter, who employed it in thirty-two cases.[2] Recently Sophian[3] has reported four cases, and Alfaro and Hitce[4] one case, making in all thirty-seven cases. These observers seem favorably impressed with the method used, which consists in intraspinal injections of sterile immune human serum, in doses of from 2 to 13 c.c. daily, the total number of injections varying in individual cases.

TABLE 1.—AGE OF DONOR, AND PERIOD OF TIME ELAPSING BETWEEN THE RECOVERY FROM POLIOMYELITIS AND THE CONTRIBUTION OF SERUM

Serum	Age of Donor, Years	Time Since Recovery from Poliomyelitis	Amount of Serum Obtained, C.c.
A	29	3 weeks	300
B	36	32 years	125
C	24	2 weeks	100
D	17	2 weeks	100
E	44	39 years	100
F	7	2½ years	75
G	8	2 years	125
H	10	9 years	150
I	18	3 weeks	250
J	7	5½ years	100

In all my cases the blood was obtained by puncture of the median basilic vein, collected in sterile glass containers, the serum separated by clotting, and kept at 36 F. until used. Wassermann tests and a careful bacteriologic examination were made in the case of each serum before it was accepted as suitable for use. No preservative was used.

Ten donors contributed the serum used in these cases (Table 1). There are no experimental results which throw any satisfactory light upon the duration in serum such as used here of the properties that neutralize the virus of acute poliomyelitis. In this series it was noted that Serums B and E, obtained thirty-two and thirty-nine years, respectively, after recovery from poliomyelitis, seemed less active therapeutically than serums obtained earlier.

Netter and Sophian gave the serum by intraspinal injection, in doses of from 5 to 10 c.c., previously withdrawing an equal or greater amount of spinal fluid. In the cases here reported, three different methods have been used, singly and in combination: intraspinal injections of from 5 to 10 c.c.; intravenous injections of from 8 to 50 c.c., and intramuscular injections of from 6 to 30 c.c. Following the intravenous and intramuscular injections, from 10 to 15 c.c. of spinal fluid were withdrawn.

Table 2 gives the manner of injection in each case, the day of the disease, and the results.

TABLE 2.—METHOD AND TIME OF INJECTION, WITH RESULTS OF TREATMENT

Case	Age	Amount of Serum Injected, C.c.			Day of Disease	Result as to Life
		Intraspinally	Intravenously	Intramuscularly		
1	16 mo.	15	8	..	6	Recovery
2	4 yrs.	16	15	..	5	Death
3	18 yrs.	22	33	..	7, paralysis 1 day	Recovery
4*	3 yrs.	10	..	..	5	Recovery
5*	2 yrs.	15	..	..	9	Death
6*	2 yrs.	5	35	..	5	Death
7	2¾ yrs.	..	8	10	2	Recovery
8	6 yrs.	10	33	..	2	Recovery
9	7 yrs.	6	25	30	3, paralysis 1 day	Recovery
10	24 yrs.	..	70	..	4	Death
11*	3 mo.	..	..	15	5	Recovery
12	2½ yrs.	5	30	..	4	Recovery
13	7 yrs.	16	54	20	3, paralysis 1 day	Recovery
14*	3 yrs.	..	12	24	Paralysis 1 day	Recovery
15	14 yrs.	..	..	65	3, paralysis same day	Recovery

* These occurred in the Cook County Hospital and were treated at the request of the authorities of the hospital.

The object of the use of immune serum in acute poliomyelitis is the neutralization of the toxic or other causative agent by specific antibodies in the serum injected. Consequently the indications are to administer the serum in such a manner as to bring it into close and direct contact with the pathogenic agent. Heretofore the serum has been injected intraspinally, but, as the cerebrospinal fluid from acute poliomyelitis only infrequently transmits the disease in experiments on animals, a question arises as to the value of introducing therapeutic agents into the spinal canal. On the other hand, the lesions in the nervous system, essentially perivascular infiltrations as they are, would seem to call for intravenous injections. Further, the lesions in acute poliomyelitis are not confined to the nervous system, but involve also, frequently to a marked degree, various other internal organs, showing the systemic presence of the virus. For these reasons, intravenous injection alone, or in combination with intraspinal injection, appears to me to be the logical method of serum treatment. In the case of infants, in which it is difficult to introduce a needle into the vein, intramuscular injections may be substituted for intravenous.

Following the intravenous or intramuscular injections, a withdrawal of from 5 to 15 c.c. of cerebrospinal fluid is suggested, in order to reduce pressure and favor circulation in the central nervous system, as is done with good results in the intravenous treatment of cerebrospinal syphilis with neosalvarsan and salvarsan.

* From the Memorial Institute for Infectious Diseases. Aided by a grant from the Fenger Memorial Fund.

1. Flexner, Simon: A Note on the Serum Treatment of Poliomyelitis (Infantile Paralysis), THE JOURNAL A. M. A., Aug. 19, 1916, p. 583.
2. Netter: Arch. de méd. d. enfants, 1916, xix, 1.
3. Sophian, Abraham: Specific Treatment of Infantile Paralysis, THE JOURNAL A. M. A., Aug. 5, 1916, p. 426.
4. Alfaro and Hitce: Semana méd., 1915, xxii, 211.

One cannot believe that a few cubic centimeters of immune serum contain any great concentration of antibodies for the virus of poliomyelitis, and it would seem rational, therefore, to employ as large doses of the serum as possible, especially in intravenous and intramuscular injections; obviously intraspinal injection must be limited to a few cubic centimeters.

In this series 50 c.c. was the largest dose; in most cases the dose was dependent on the quantity of serum on hand at the time. Still larger doses are advisable, and should be repeated daily in severe cases.

TABLE 2.—EFFECT OF INTRASPINAL INJECTIONS OF IMMUNE SERUM ON THE LEUKOCYTES OF THE SPINAL FLUID

Case	Cells per C.mm. in Spinal Fluid Before First Intraspinal Injection	Cells per C.mm. in Spinal Fluid 24 hrs. After First Intraspinal Injection	Cells per C.mm. in Spinal Fluid 24 hrs. After Second Intraspinal Injection	Cells per C.mm. in Spinal Fluid 24 hrs. After Third Intraspinal Injection
1	40	4,130	230	20
2	48	217	...	..
3	47	175	...	..
4	202	171	240	..
6	84	165	110	..
7	18	40	...	..
9	278	149	...	..
16	119	180	23	..
5	...	64	...	30

In the majority of cases, following the first intraspinal injection there results an increase in the number of leukocytes in the spinal fluid; usually with increase in the proportion of polymorphonuclear cells. The count of 4,130 in Case 1 contained 90 per cent. polymorphonuclears, whereas the blood at the same time contained only 55 per cent. polymorphonuclears. Use of the serum, by any of the methods employed, apparently had no immediate effect on the leukocyte of the blood, which dropped gradually to normal within a few days.

In three cases, following intravenous injection a fall in the cell content of the spinal fluid occurred, while in one case the number of cells was increased.

A brief account of two typical cases may serve to illustrate the results in general.

CASE 1.—In a girl, aged 16 months, the symptoms appeared five days previous to the first injection. On entrance to the hospital there was paralysis of both arms and legs and paralysis of the external respiratory muscles; respirations were irregular, shallow and entirely diaphragmatic; dyspnea and cyanosis were present. The temperature was 103 F.

August 16, there were 15,700 leukocytes and 72 per cent. polymorphonuclears. The spinal fluid contained 40 leukocytes per cubic millimeter. Five c.c. convalescent serum were injected intraspinally.

August 17, there were 20,450 leukocytes and 55 per cent. polymorphonuclears. The spinal fluid contained 4,130 leukocytes per cubic millimeter, and 90 per cent. polymorphonuclears. Five c.c. convalescent serum were injected intraspinally, and 8 c.c. intravenously.

August 17, the spinal fluid contained 230 cells per cubic millimeter. Five c.c. convalescent serum were injected intraspinally.

August 19, the spinal fluid contained 20 cells per cubic millimeter.

August 20, the spinal fluid contained 3 cells per cubic millimeter.

On admission the prognosis seemed very bad, but following the second injection of serum there was marked general improvement ending in recovery.

CASE 2.—In a boy, aged 18 years, the onset occurred August 16, with malaise, headache and fever. Paralysis was first noticed August 23 in the left leg and right arm. The patient was admitted August 24, semicomatose and delirious, with rigidity, tenderness and pain in the neck, bilateral flaccid paralysis of arms and legs, respirations superficial, acute retention of urine, and temperature 101.

August 24, there were 15,500 leukocytes and 74 per cent. polymorphonuclears. The spinal fluid contained 302 leukocytes per cubic millimeter, 92 per cent. being small lymphocytes. Five c.c. immune serum were injected intraspinally.

August 25, there were 13,350 leukocytes and 70 per cent. polymorphonuclears. The spinal fluid contained 171 leukocytes per cubic millimeter, 88 per cent. being small lymphocytes. Eight c.c. serum were injected intraspinally and 8 c.c. intravenously.

August 26, the patient's condition was much improved, the temperature normal; 12,250 leukocytes. The spinal fluid contained 240 leukocytes per cubic millimeter, 26 per cent. being polymorphonuclears. Nine c.c. serum were injected intraspinally.

August 27, the condition was much improved.

August 28, the condition was not so good. Twenty-five c.c. serum were injected intravenously; four hours later the patient appeared and felt much better. Recovery followed.

In none of the cases were ill effects noticed from the serum, or symptoms indicating the presence in the serum injected of lysin or agglutinin for the corpuscles of the recipient. Precautionary tests for these substances should be carried out as a safeguard to the recipient.

In the treatment of these cases, one was impressed with the marked improvement that followed within a few hours after injection of the serum, and particularly after intravenous injection; whether this result was due to specific antibodies in the injected serum or to the injection of so much serum only has not been determined. To me the results of the use of immune serum seem sufficiently favorable to warrant its use until more satisfactory measures are obtained.

Finally, in drawing conclusions as to the merits of the serum treatment in acute poliomyelitis, the possibility must not be overlooked that part at least of the improvement which occurs in patients receiving intraspinal injections, or in which spinal fluid has been withdrawn, may be due to the relief of increased intraspinal and intracerebral pressure.

SUMMARY

1. The administration of immune serum in acute poliomyelitis is based on recognized principles of immunity.

2. Because the lesions are not confined to the nervous system, and because the lesions therein consist essentially of perivascular infiltration, intravenous injection of serum appears to be a rational procedure, either alone or in combination with intraspinal injection.

3. Intravenous injections of serum should if possible consist of doses of from 50 to 100 c.c. or more daily.

4. Following intravenous or intramuscular injections of serum, spinal fluid should be withdrawn.

5. Intraspinal injection of serum usually produces an increase in the number of the leukocytes with increase in the proportion of polymorphonuclear cells in the spinal fluid.

6. No ill effects have followed the use of serum in this series, either by intravenous or intraspinal injection.

7. In all cases after intravenous injection, and to a less degree after intraspinal injection, a noticeable

improvement usually occurred, which, unfortunately, however, in some cases was only transient.

8. Early administration of the serum is urged, necessitating therefore an early diagnosis of the disease; in severe cases late administration of the serum has produced little if any noticeable influence on the course.

A REPORT OF ONE HUNDRED CONSECUTIVE CASES OF FIBROMYOMATA UTERI SUBJECTED TO OPERATION *

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PHILADELPHIA

The criticism has frequently been made that a collected series of fibromyomata uteri do not furnish accurate information on the life history of these tumors. That position is well taken, as the conclusions drawn from such studies have greatly underestimated the danger of these tumors. A consecutive series studied carefully, histologically, will demonstrate that the malignancies in the uterus and the degenerations in the tumor are decidedly more frequent than is generally believed.

TABLE 1.—MALIGNANCY AND DEGENERATIVE CHANGES IN TUMOR IN THIRTY-ONE CASES

Calcareous infiltration	2
Carcinoma corporis uteri	7
Carcinoma cervicis uteri	2
Carcinoma of ovary with extension to uterus and sigmoid	1
Hyaline degeneration	11
Myxomatous degeneration	1
Necrosis	6
Sarcomatous	1
Total	31

The subject-matter of this paper is based on my first 100 consecutive cases of fibromyomata uteri subjected to operation. While the number is not sufficient from which to draw definite conclusions, the material shows some interesting facts which will be given for what they are worth. With the exception of one specimen removed in Canada and one which was lost before reaching the laboratory, all have been examined microscopically. Every specimen in which the pathologist reported a malignancy and every specimen which was clinically suspected of malignancy, was subjected to another microscopist. A better check on the pathologic diagnosis is the ultimate result, which will be given in another part of the paper.

A persistent effort has been made to obtain a recent report in every case, but in a few this has been impossible. In such cases, if the record showed six or more months after the operation that the patient was in good condition and free from all symptoms, it is considered a cure and is so recorded in this paper. The date of the last report is recorded in Table 4 under heading "Remarks and Results." "No Report" means that all trace of the patient was lost shortly after being discharged from the hospital. The recent reports were obtained by letters from the patients and in many cases by reports in person and from the family physicians, to whom I wish to express my deep appreciation for the prompt and satisfactory replies.

Malignancy in the pelvic organs, and degenerative changes in the tumor were found as shown in Table 1. These took place in thirty-one patients, which is double the percentage usually reported.

There were in all nine cases of carcinoma of the uterus, one case of carcinoma of the ovary with secondary involvement of the uterus, and one case of sarcoma, making 11 per cent. of the cases complicated by a malignancy of the pelvic organs. There was one patient who had a suspicious breast and a radical operation was performed a few days after the hysterectomy. Histologic examination showed the tumor to be a carcinoma. This tumor was no doubt an independent lesion. Nevertheless, it makes 12 per cent. of the patients who harbored a malignancy.

There were two or three specimens which one pathologist diagnosed early malignancies, while the other claimed they were cellular myomas. These have been recorded as benign tumors, but the patients will be kept under close observation. In Case 78 and Case 89 a malignancy was not suspected, the diagnosis being made in the laboratory.

The percentage of malignancies in this series is decidedly larger than usually reported, which shows the fallacy of drawing conclusions from a collected series. In 3,561 collected cases reported by the writer[1] in 1908 the condition was present in 4 per cent. In 337 cases operated on by Noble[2] malignancy was present in seventeen, or 5 per cent. In the last 100 cases he reported malignancy was found in 8 per cent. Bland-Sutton[3] states that malignancy in the corpus uteri will be found in over 10 per cent. of the cases in women past the age of 50 who submit to operation. In a series of 500 consecutive cases submitted to operation he found among sixty-three women of 50 years and upward eight, or 12.7 per cent., who had cancer of the corporal endometrium, as well as fibroids. Geist,[4] in a series of 250 cases of uterine and cervical myomas, found that twelve, or 4.8 per cent., showed sarcomatous changes. Winter[5] believes that if myomas are examined systematically sarcoma will be found in about 4 per cent. of all cases. Freund[6] in 500 myoma cases found carcinoma in the uterus or ovary in 6 per cent.; Kline[7] in 491 cases found malignancy in 7.7 per cent.; and Mackenrodt[8] in 418 cases found malignancy in 7.7 per cent.

It is well known that cancer is on the increase and surgeons are realizing more fully that all specimens should be examined microscopically, and as a result more laboratory work is being done. For these reasons we can expect to find malignancy associated with fibromyomata uteri in a larger percentage of cases as time goes on. The death rate from cancer in the United States registration area increased from 62.9 per 100,000 population in 1900 to 78.9 in 1913

In studying these degenerations it is important to know at what age they take place, as it has a decided

* Because of lack of space, this article is abbreviated in THE JOURNAL. The complete article appears in the Transactions of the Section and in the author's reprints.

* Read before the Section on Obstetrics, Gynecology and Abdominal Surgery at the Sixty-Seventh Annual Session of the American Medical Association, Detroit, June, 1916.

1. Tracy, Stephen E.: Fibromyomata Uteri, a Study of the Degenerations, Complications and Associated Conditions of 3,561 Cases, Surg., Gynec. and Obst., 1908, vi, 246.
2. Noble, Charles P.: Fibroid Tumors of the Uterus, Jour. Obst. and Gynec. Brit. Emp., 1906, x, 436.
3. Bland-Sutton, Sir John: Fibroids of the Uterus; Their Pathology, Diagnosis and Treatment, London, 1913.
4. Geist, Samuel H.: A Contribution to the Histogenesis of Sarcomatous Change in Uterine Fibromyomata, Am. Jour. Obst., 1913, lxviii, 1053.
5. Winter, Georg: Die malignen und benignen Degenerationen der Uterusmymome, Ztschr. f. Geburtsh. u. Gynäk., 1906, lvii, 10.
6. Freund: Quoted by Nordentoft, Panner and Kjaergaard; abst., THE JOURNAL A. M. A., Aug. 22, 1914, p. 714.
7. Kline: Quoted by Nordentoft, Panner and Kjaergaard; abstr., THE JOURNAL A. M. A., Aug. 22, 1914, p. 714.
8. Mackenrodt: Jour. Obst. and Gynec. Brit. Emp., 1914, xxvi, 219.

bearing on whether we do conservative or radical surgery. In this series, sixty-four patients were 40 years of age or upward. In a series of 714 cases, including my own and those taken from the reports of the Kensington Hospital for Women from 1893 to 1909, inclusive, and from the papers of Cullingworth[9] and Scharleib,[10] in which the age of the patient was given, the degenerations took place, divided into decennial periods, as in Table 2.

TABLE 2.—DEGENERATIONS ACCORDING TO AGE OF PATIENT IN 204 CASES OF FIBROMYOMATA UTERI

Nature of Degeneration	Under 30	30-40	40-50	50-60	60-70	70-80	Total
Myxomatous degeneration	...	6	5	..	..	..	11
Necrosis of tumor	2	19	25	8	3	..	57
Cystic degeneration	1	5	6	1	3	..	16
Sarcomatous	...	1	4	4	2	..	11
Edema of tumor	2	11	12	5	..	..	30
Carcinoma of corpus uteri	...	..	3	6	2	1	12
Calcareous infiltraton	...	1	2	3	4	..	10
Carcinoma cervicis uteri	...	2	3	1	..	..	6
Hyaline degeneration	3	7	24	3	..	..	37
Hyaline degeneration and necrosis	...	..	..	2	..	..	2
Hyaline degeneration and edema	...	..	1	..	..	..	1
Myxomatous degeneration and calcareous infiltration	...	..	1	..	..	..	1
Calcareous infiltration and necrosis	...	1	..	..	..	..	1
Fatty degeneration	...	..	1	..	..	..	1
Inflammation	...	1	..	..	..	..	1
Carcinoma	...	..	..	..	1	..	1
Necrotic carcinoma	...	..	1	..	..	..	1
Malignant change	...	..	1	..	..	..	1
Adenocarcinomatous change	...	1	..	..	..	..	1
Epithelial degeneration	...	..	..	..	1	..	1
Necrotic or sarcomatous degeneration	...	..	..	1	..	..	1
Calcareous infiltration, necrosis, adenocarcinoma corporis uteri	...	..	..	1	..	..	1
Total	8	55	80	35	16	1	204

The age at which the degeneration took place in the 714 cases, varied from 23 years to 72 years. Of 204 cases in which degeneration took place, 141, or 69 per cent., occurred after the age of 40. Of thirty-five cases of malignancy, thirty-one, or 88.57 per cent., took place in women of 40 years and upward. In this series of 100 cases degenerations took place in thirty-one. Of these, in twenty-six, or 84 per cent., the degeneration took place in women of 40 years or upward. In 11 cases of malignancy of the pelvic organs ten, or 90.9 per cent., occurred in women past the age of 40 years, another evidence of discrepancy in a collected series.

Abdominopelvic lesion associated with the fibromyomas were as is shown in Table 3.

TABLE 3.—ABDOMINOPELVIC LESIONS ASSOCIATED WITH FIBROMYOMA

Lesion	No. Cases
Appendicitis	30
Gestation	2
Gestation, ectopic	3
Cholelithiasis	1
Hernia, incisional	1
Hernia, inguinal	1
Hernia, umbilical	1
Hydrosalpinx	2
Ovarian cyst	4
Ovarian cyst, intraligamentous	3
Ovarian fibroma	1
Pyosalpinx	3
Prolapsus uteri	4
Retroversus uteri	2
Salpingitis	17
	75

In only nineteen of the 100 cases were there no associate lesions of the abdominal or pelvic organs and no change in the tumors or uterus. In fifty-six cases there were surgical lesions in the abdomen or pelvis in addition to the fibromyomas.

The thirty cases of appendicitis do not indicate that the appendixes were removed simply as a routine, but that they showed some clinical evidence of a pathologic character.

The two cases of gestation subjected to operation were deliberately performed. In one case the tumor caused the uterus to rotate to the extent that it caused severe pain, from which the patient demanded relief. In the other case the patient was seen in consultation at the fourth month of the first gestation. The pelvis was filled with fibromyomas, which did not rise as the uterus enlarged. The pregnancy was allowed to continue to nearly term, when a cesarean section was performed and the uterus removed.

Of the 100 patients, sixty-three were married, eleven were widowed and twenty-six were single. Of the seventy-four who were or had been married, fifty-four, or 72 per cent., had borne children.

The surgical procedures carried out in these cases consisted of supravaginal hysterectomies sixty-four; panabdominal hysterectomies twenty; vaginal hysterectomy one; abdominal myomectomies nine; vaginal myomectomies six. In every case of known malignancy, suspected malignancy and extensive laceration of the cervix, a panhysterectomy was done, unless there was some contraindication. Besides the operative procedures enumerated, several of the patients had plastic work at the time the tumors were removed. Case 72 had a plastic operation, a shortening of the round ligament and an appendicectomy in addition to the myomectomy.

The primary mortality was 2 per cent. Case 23, that of a pale, weak patient, did well the first four days, when her special nurse gave a bath on a winter's day with the windows wide open; she promptly developed a double pneumonia and died on the eighth day. In Case 66 the patient developed renal insufficiency and died fifty-two days after operation. She had recovered from the operation, but remained at the hospital for medical treatment; as she died in the institution the fatality is included in the series.

In reviewing the results of the cases subjected to hysterectomy one of the most important factors from the standpoint of the patient is the amount of suffering from the artificial menopause. The patients have been questioned closely on these symptoms and every effort has been made to classify them accurately. The degree of the menopausic symptoms have been divided into five classes as follows: no symptoms, very mild, mild, moderately severe, and marked.

Of the patients subjected to hysterectomy, in seventy-two the menstrual function was still active. Of these, in twelve one or both ovaries were allowed to remain; in six both ovaries; in four the right, in two the left; five are dead; seven cannot be traced, which leaves forty-eight traced patients who had both ovaries removed. Of these forty-eight cases, nine, or 18.7 per cent., had no menopausic symptoms; in eight, or 16.8 per cent., the symptoms were very mild; in twenty, or 41.6 per cent., the symptoms were mild; in 7, or 14.5 per cent., the symptoms were moderately severe; and in four, or 8.3 per cent., the symptoms were marked. In 77 per cent. of the cases the disturbance as a result of the artificial menopause varied from no symptoms to mild discomfort.

Of the twelve patients in whom one or both ovaries were allowed to remain, ten have been traced. In five,

9. Cullingworth, C. J.: Jour. Obst. and Gynec. Brit. Emp., 1902, i, 3.
10. Scharleib, M.: Jour. Obst. and Gynec. Brit. Emp., 1902, ii, 323.

or 50 per cent., there were no menopausic symptoms; in two, or 20 per cent., the symptoms were very mild; in one, or 10 per cent., the symptoms were moderately severe; while in two, or 20 per cent., the symptoms were marked. These two patients were pronounced neurasthenics before the operation, and after the operation they complained greatly of the menopausic symptoms. Their physical condition is good and they have been cured of all symptoms caused by the tumors. They would no doubt have complained to the same extent had they gone through the natural menopause.

Of the patients in whom one or both ovaries were allowed to remain, 50 per cent. had no symptoms of the menopause, as compared with 18.7 per cent. of the women who had the ovaries removed. On the other hand, of the women who had the ovaries removed, the menopausic symptoms were absent or mild in 77 per cent., as compared with 70 per cent. in women who had one or both ovaries left in. When doing a hysterectomy in a patient whose menstrual function is active, if an ovary is perfectly normal it should probably be allowed to remain, but should be so placed and anchored that it cannot lie in the bottom of the pelvis and cause pain. On account of the liability of adhesions about and pressure by the sigmoid, I prefer to leave the right ovary. Unless an ovary is absolutely normal it should not be allowed to remain.

Several of the patients with menopausic symptoms were made comfortable by the administration of corpus luteum. Unfortunately, the records on the use of this product are not sufficiently complete to give figures or percentages.

In patients past the age of 40 years, I believe it makes but little difference whether the ovaries are allowed to remain or are removed, as the menopause will soon take place and the majority of women do not have any serious trouble.

In this series there has been no reason to regret that an ovary has been allowed to remain. In none of the traced cases has it been necessary to do a second operation for the removal of these organs.

In the series there were fifteen myomectomies, nine abdominal and six vaginal. Of these, eight of the patients were married, two were widowed and five were single.

Of the nine abdominal myomectomies, eight of the patients were of the child-bearing period. Of the nine patients, seven have been traced, while two could not be located. Of the seven heard from, six were of the child-bearing age; three of the six were either single or widowed. Of the three who were married, there has been one pregnancy, which terminated in a miscarriage. The family physician stated he believed the miscarriage had been induced. One of the single women has married since the operation, but has not conceived.[11]

Of the six vaginal myomectomies, five have been heard from. Two of these patients are past the child-bearing period. Of the three patients in whom gestation is possible, one is still single, and of the others there have been no pregnancies.

One patient on whom an abdominal myomectomy was performed continued to have metrorrhagia after the operation. She has been cured by Roentgen-ray treatment, one of the few indications for roentgenotherapy.

11. His patient came for examination since this paper was presented and is now (July 29, 1916) over five months' pregnant.

In Case 100, the patient came for the cure of a prolapse of the cervical stump with a complete eversion of the vagina, a cystocele and rectocele. She had had a supravaginal hysterectomy by another surgeon four or five years previously. A fibromyoma the size of a large walnut was removed from the posterior, upper right corner of the cervix and a plastic operation cured the prolapse and eversion.

In spite of every effort to trace these patients, eleven could not be located, which leaves eighty-nine patients accounted for. Of these, eleven are dead, the cause of death being as follows:

Miss C. (Case 5), died of acute mania one and one half years after the operation.

Mrs. McG. (Case 15), advanced carcinoma of the uterus, died of a recurrence in about three years.

Mrs. C. (Case 19), advanced sarcomatous degeneration, died of a recurrence in four months.

Mrs. M. (Case 22), carcinoma of corpus, died of uremia about two and one half years after operation. Family physician reported there was no evidence of a recurrence.

Mrs. M. (Case 23), died of a double pneumonia the eighth day after operation. Described under primary mortality.

Mrs. H. (Case 27), carcinoma of corpus, which had perforated the uterus and extended through the broad ligament to the side of the pelvis, died of recurrence in one year. She was prepared for operation about a year earlier, but lost her nerve and went home. She also lost her opportune time, as there was then no evidence of involvement beyond the uterus.

Mrs. C. (Case 34), a well developed carcinoma of cervix. Had a considerable recurrence when seen last at the end of a year (1911) and is considered long since dead.

Mrs. D. (Case 41), died of cardiovascular renal disease eight months after operation. This patient had a pronounced heart lesion and on this account had been refused operation at another hospital. She had long suffered with metrorrhagia and for two years preceding operation had been confined to bed most of the time. Her blood pressure was low and there was no evidence of renal degeneration. After operation she developed a phlebitis beginning at the base of the skull, extending down the neck and the left upper extremity. She recovered from this and enjoyed good health a few months, when the blood pressure began to mount, the urine contained albumin and casts, and there was bleeding from all the mucous membranes.

Mrs. S. (Case 64), malignant ovarian cyst with advanced secondary involvement of uterus, broad ligaments and sigmoid, died of recurrence in eleven months.

Mrs. B. (Case 66), carcinoma of corpus, died of uremia fifty-two days after operation. Described under primary mortality.

Mrs. Z. (Case 84), advanced carcinoma of corpus, which had extended through the uterine wall, had a recurrence, or what would be more accurate an extension of the process, and died suddenly five months after operation.

Of the eleven patients with malignancy, six have died of recurrence, one died of uremia fifty-two days after operation, another died of uremia with no evidence of recurrence two and one half years after operation. Three are alive and well: one (Case 44) four years and nine months after operation, one (Case 78) two years, and one (Case 89) seventeen months.

With the exception of Case 78 and Case 89, the malignancy was well advanced and in several cases it was a question if the result would be worth the effort. With the exception of Case 19, sarcomatous degeneration, in which the operation was probably of no use whatever, life was prolonged and the hemorrhage and offensive discharge were eliminated, which made the tragedy somewhat easier for the patient and the family.

Of the seventy-eight patients alive and traced, we have the following results: One patient, while cured of the pelvic lesions had an infection of the incision with a resulting hernia. One patient after a plastic operation, a myomectomy, an appendicectomy and a shortening of the round ligaments, continued to have metrorrhagia, which was controlled by Roentgen-ray treatment, and is not considered a surgical cure. The combination of treatments was ideal. There was no excuse for a hysterectomy, which would have controlled the bleeding, as the tumors were small and the patient comparatively young. On the other hand, the Roentgen rays would not have cured the lacerations, the displacement, or the chronic appendicitis. One patient is well except for so-called chronic rheumatism. One patient, a marked neurasthenic, has a cystitis and claims she is no better than when bedridden with a pelvis and lower abdomen filled with a fibromyoma and a bilateral femoral phlebitis from pressure. The remaining seventy-four are well and are enjoying good health. To these should be added, as cured of the pelvic trouble, the one who has rheumatism, making a total of seventy-five, or 96 per cent., cured. From the seventy-five, three who are now in good health, should be held under advisement, as they had a malignancy of the uterus associated with the fibromyomas.

In Case 68 the glycosuria disappeared a few weeks after operation.

The one thing that is worthy of especial emphasis in this series is the percentage of malignancies and with two exceptions they were well advanced cases. The only way we can hope to improve our results in fibromyomas complicated by a malignancy is to educate the profession and the public to the danger of these tumors. Fibromyomas are not innocent tumors which are cured by the menopause. On the contrary, they are progressive, insidious neoplasms, whose danger increases with advancing age of the patient; 87.5 per cent. of the malignancies and the degenerations in the tumors in this series were in women over 40 years old. Why any man, and especially a surgeon, will tell a woman past the age of 40 who has a fibromyoma with metrorrhagia not to worry, that she will be cured by the menopause, is beyond my comprehension. This may explain why some men have so few malignancies associated with their cases of fibromyomas. He who gives such advice is responsible if an incurable malignancy develops while the patient is serenely waiting a menopausic cure.

I trust there is no surgeon who will deny that there is an intimate relation between fibromyomas and carcinoma of the corpus. Any series of cases carefully studied will show that the vast majority of malignancies are in the corpus; while the majority of malignancies of the uterus which do not contain fibromyomas are in the cervix.

While time will not permit a discussion of other methods of treatment, I cannot refrain from asking my radiotherapy friends, who talk about the control of bleeding as being a cure, what they would hope to accomplish in the way of relieving these patients of their abdominal and pelvic symptoms by the Roentgen-ray treatment, when there were only nineteen patients who had neither a malignancy of the pelvic organs, a degeneration of the tumor or an associate abdominal or pelvic lesion. While I will concede there is a certain small percentage of cases, as outlined by the writer[12] in a paper before the state medical society in 1914 that should receive roentgenotherapy, I do maintain that with a few exceptions all fibromyomata uteri which produce symptoms should receive early surgical treatment.

OPERATIVE TREATMENT OF FIBROMYOMATOUS UTERINE TUMORS*

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General interest in the question of the treatment of myoma of the uterus has been rekindled by the enthusiastic claims of advocates of the Roentgen ray and radium treatments. Surgery has fought and won against the old ideas of the harmlessness of the majority of these uterine growths, showing that in many cases they take on activity after a period of quiescence, that they undergo malignant degeneration, that they may produce harmful pelvic and abdominal lesions, that they predispose to carcinoma of the uterus, that they produce a variety of harmful pressure effects and in short that any given series of women who are the subjects of these growths will in time show a large percentage who suffer from one or more of a great variety of complications that are more or less disabling or dangerous to life.

We have fought to a finish the idea that if a woman could be tided along to the menopause, it could be expected that the fibroids would then shrink and cease from troubling.

We have seen the Roentgen ray advocated and have noted some success in its employment for the control of the associated metrorrhagia of fibroid tumors of the uterus. We have had authenticated cases, not only of symptomatic improvement, but also of material diminution in size of tumors so treated. We all hoped for a time that an absolutely safe and specific remedial agency was in our possession. Now sufficient time has elapsed for us to conclude that many failures are to be expected with the Roentgen-ray treatment, that a certain amount of positive harm can come from it and that a vast amount of harm can result in this form of delay of radical treatment in cases where that alone offers any prospect of cure.

Now we are confronted by radium, for which more extended claims are made, and we are asked to believe that it will not only control the symptoms, but also cause a disappearance of the growth in many instances. It is therefore well to review our results with the operative treatment, in order that we may see whether the profession is justified in running after this new prophet, which to our mind is about to prove itself as false as those which have preceded.

It is obvious that a considerable time must elapse before the radium treatment can be stamped with the final verdict of history. A patient treated by radium,

12. Tracy, Stephen E.: Treatment of Fibromyomata Uteri; Whether Surgery or Radiotherapy, Pennsylvania Med. Jour., 1915, xviii, 353.

* Read before the Section on Obstetrics, Gynecology and Abdominal Surgery at the Sixty-Seventh Annual Session of the American Medical Association, Detroit, June, 1916.

even though symptomatically improved, still has her fibroid, for I do not take seriously the claim that such tumors disappear under the influence of the radiations. I have operated on too many patients that have failed to be cured by radium to allow me to believe in such marvelous and specific efficacy. I am willing to grant that well-attested cases exist in which shrinkage of the growth has followed this form of treatment. I admit that a certain type of metrorrhagia can be controlled. I am not ignorant of the fact that more or less obscure relations exist between ovarian function and pelvic congestion, and therefore that in this way by influencing the blood supply of the uterus and its contained tumors it may be possible to check hemorrhage, arrest growth, and perhaps in a few favorable cases actually to reduce the size of this neoplasm.

I am willing to grant even that there is a certain direct effect of the rays on the tumors themselves, though unfortunately this is not a specific effect and therefore associated with similar changes in other tissues in which they are undesirable. In short, it cannot be denied, if anyone had the disposition to do so, that the sum total of the effects of both the Roentgen ray and radium on tumors of this group at times result in changes that are beneficial to certain patients. It is quite a difficult thing to say that these facts point to radiation as the treatment of choice or even to conclude that it is safe to try it first, before recommending the operative method. The majority of cases of appendicitis will recover from the attack under proper medical treatment, but that has not prevented the profession from taking the firm and uncompromising stand that appendicitis is a surgical disease, in which temporizing is to be condemned as unsafe. The Roentgen ray and radium have a pronounced influence over malignant growths, and if applied early enough doubtless will dissipate certain cases of carcinoma and sarcoma, but we nevertheless consider it malpractice to employ these measures in any case amenable to excision. The only difference in the failure of Roentgen rays and radium in the case of malignant disease and their failure in dealing with fibroids is in the fact that in the former case the inevitable fatalities at once drummed the treatment out of court, while in the latter the relatively benign character of the condition and the slow development of its morbidity and mortality from complications makes actual proof of the insufficiency of the treatment a matter of time and comparative statistics. Yet I maintain that it is not necessary to wait for these slower processes if we use only what knowledge has already accumulated.

In my opinion we are now justified in asserting that both the Roentgen ray and radium have failed to demonstrate specific power over fibroid growths and therefore must be placed in the category of symptomatic forms of treatment which accomplish good results in occasional cases, like the use of corrosive plaster in epithelioma, but when used as a measure of general applicability, will do great harm in causing delay of the radical treatment and exciting false hopes of nonoperative cure that may deprive many of proper treatment. In all cases the treatment is expensive and often tedious. It does not safeguard against future trouble. There is no reason to believe that it can abolish the well-attested toxic effect of certain myomas on the heart and possibly other organs. Bearing in mind also the curious relationship between various radiations and malignant disease, one finds it is impossible to dismiss subsequent hazard of carcinoma or sarcoma in the pelvic tissues. Time only will settle this point and in any event the abnormal pelvic organs can be expected to show as time goes on a fair percentage of malignant conditions, whether or not they are the result of ray treatment or entirely independent of it. We can conclude that operation, by which the patient is rid completely and finally of the growth or growths and associated pathology, remains the ideal treatment. It is not time for the profession to take a stand and condemn the excessive zeal of those who would displace operation or relegate it to a last resort, and instead put radium in its proper place as a symptomatic treatment to be employed only when operation is contraindicated?

The great argument in the use of the Roentgen ray or radium is the absence of immediate mortality. But the question of mortality must be faced in any operation. There would be no operation of any kind if a chance of mortality were the predominant factor. If radium cannot fill the place of operations, and we have seen that this is the case, it is proper to assess the dangers of operation in order to determine whether they are prohibitive of ideal treatment.

In a previous series of 250 operations[1] my mortality figures amounted to 9.13 per cent., although the last operations proceeded with but three deaths (2.3 per cent.). In this series of 750 operative cases, covering a period of eleven years (from 1905 to 1915, inclusive), there were only thirteen deaths, reducing the mortality to 1.73 per cent.; and it gives me great satisfaction to be able to state that the last 100 of these operations passed off without a single fatality.

The results of radium would need to be marvelous, indeed, if it is to vie as a symptomatic treatment with an ideal curative treatment that shows so small a mortality.

Furthermore, it should be noted that a large number of these cases were such as could scarcely be undertaken with any hope of success by even the extreme radium enthusiast. Many possessed huge fibroids which had contracted extensive adhesions. Some were parasitic on the omentum or intestines. Numerous degenerative changes were present. Of the last 513 cases, 111 showed hyaline degeneration. In twenty-six it was either hemorrhagic, necrotic or calcareous or a combination of these. Carcinoma was associated in eight cases. Tuberculosis was noted in one case. Pyosalpinx was found fourteen times. In two cases tuberculous salpingitis was present. Ovarian cysts were found in forty-eight cases and intraligamentary cysts in seven. Of the ovarian cysts eight were dermoids. Two showed intracystic papillomas and in two early malignant changes were found. Sarcoma of the ovary was observed once. It will be noted that the percentage of associated malignant disease alone was larger than the percentage of mortality. What should we say of any form of treatment that tends toward delay?

Note, moreover, that these malignant conditions were actually present at the time of operation. In view of the admitted tendency for the development of malignant changes in such conditions with any treatment other than the operative, a further toll from cancer or sarcoma will be exacted at a later date. This is true entirely irrespective of the question as to whether the ray treatment actually predisposes toward malignant changes though several cases are already on record in which this seemed likely. Since all will admit

1. Deaver, John B.: Am. Jour. Obst., 1905, lii, 858.

that no one can diagnosticate these forms of malignancy early enough to cure more than a small percentage, is it not true that the effect of symptomatic treatment will be to raise the mortality from cancer and sarcoma, a step backward toward the dark ages?

A considerable number of patients were operated on at the same time for other conditions, such as hernia, lacerations of the perineum, hemorrhoids, cholelithiasis, cholecystitis and appendicitis. The appendix was removed 513 times. About forty-eight were approximately normal, four showed acute suppuration. The remainder presented chronic interstitial or obliterative processes. The net gain in the correction of these conditions is an additional argument for operation.

The postoperative history was uneventful in the great majority of cases. A number of cases of pneumonia, pleurisy and phlebitis, ten in all, soon yielded to treatment and the recuperative powers and were followed by uneventful recovery. In fifteen instances the wound broke down, twice as a result of violent coughing. Ureterovaginal fistula and vesicovaginal fistula each occurred twice after panhysterectomy, requiring secondary operations. One patient developed both fecal and vesicovaginal fistula and two had fecal fistulas alone. One patient had postoperative parotitis. One patient, on the third day, began to vomit copiously, with signs of acute dilatation of the stomach, but was relieved by the stomach tube. Convalescence was prolonged in one case by cholecystitis, in another by a profuse purulent discharge and in a third by painful defecation. As a rule recovery was established in ten days to two weeks and the patients dismissed in good condition to continue their convalescence.

Operative deaths are in the majority of instances due to infection. In this series seven died of peritonitis. Paresis of the bowel, probably of toxic origin, was responsible for one death. Pneumonia, myocarditis, asthenia, cardiac failure and shock were given as the causes of the fatal termination in the remaining five cases.

Against this list of mortality and complications we cannot allow the advocates of radium to urge their procedure as possessing no mortality. Surgery is the only cure of malignant disease, and as mentioned above, the malignant degenerations found in this series actually exceeded the mortality percentage. Therefore any treatment other than operation should be credited with this mortality since it deprives the patient of his only hope of cure. Moreover, it is certain that these damaged organs if left in situ would inevitably in a large percentage of cases become the seat of malignant disease. The prevention of such changes by removal actually places a balance to the credit of operation, while it further condemns so-called conservative treatment.

Morbidity also will be a much more marked feature of any palliative treatment than it is of radical measures which remove the root of the troubles. Shall we not acknowledge frankly, therefore, that radium has failed as the treatment of choice for fibroids and associated conditions and return to the improvement of our most effective arm?

The operation of choice is supravaginal amputation of the uterus, because it is simpler and less liable to infection and other complications than removal of the entire uterus. An exception should be made when the cervix is distinctly abnormal by reason of lacerations, ulceration or inflammatory conditions. In this case the whole organ should be removed. Ovaries should always be left unless diseased. In younger women one ovary, or a portion of it, should be left, unless such marked inflammation or neoplastic changes are present as to make it dangerous to do so. In women beyond 40 more latitude in removal of the ovaries is justifiable, but they should never be needlessly sacrificed.

It is my practice to fix the round ligaments and the stump of the upper portion of the broad ligaments into the cut surface of the cervix, or, in the case of panhysterectomy, to the vagina on each side. This aids in restoring the support of the pelvic floor and distributes more equally the intra-abdominal pressure on the pelvic structures, causing less liability to bladder and rectal symptoms.

Myomectomy I rarely advise. Only occasionally does one see a case to which it is adapted. Myomas are usually multiple and when single are apt to be so large at the time of operation as to render hopeless any attempt to save a functionally sound uterus. Occasionally, in the case of young women, it is justifiable, but it is well to remember that it may be a more complicated and dangerous operation than removal of the uterus.

I must mention the service that will at times be rendered by the operation of hysterotomy. Occasionally it is impossible to distinguish between a pregnant uterus and one symmetrically enlarged by a myoma. In such cases an incision will promptly clear the diagnosis and prevent the error of either removing a normal pregnant uterus or leaving behind one which is merely the seat of a deceptive tumor. It is at times possible also by this method to expose a small bleeding mucous polyp or submucous myoma and save the uterus. Unsuspected malignant disease of the interior of the uterus also may be detected in this way and indicate a more radical procedure than would otherwise be carried out.

In conclusion let me say that the operation for the case of fibroid tumor of the uterus has been to me one of the most satisfactory in all surgery. If performed on operable patients at a timely season the mortality is exceedingly low, the results almost uniformly good. When cure is indicated symptomatic treatment has no place.

In the last 750 operations there were sixty-eight supravaginal amputations of the uterus without removal of the tubes and ovaries, 325 supravaginal amputations of the uterus with removal of both tubes and ovaries, and 145 supravaginal amputations with partial removal of the tubes and ovaries. There were ninety-nine complete abdominal hysterectomies, twenty vaginal hysterectomies, and ninety-three abdominal myomectomies.

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Sour Grass Soup and Ptomain Poisoning.—A recent investigation of several cases of illness occurring in the East Side of New York and thought to be due to ptomain poisoning were found to be due to sour grass soup. This soup is prepared from "qchav" or "szchav" leaves, commonly known as sour grass, a species of sorrel. It is rich in oxalic acid salts, an analysis in the chemical laboratory of the department of health showing as much as 2 grains of oxalic acid in an ounce of leaves, and double that in the stems. This investigation shows that sour grass soup is a popular dish on the East Side. Chemical analysis of the soup has shown about 10 grains of oxalic acid to a pint of soup.

RECENT PROGRESS IN THE TREATMENT OF UTERINE CANCER*

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The most worthy methods of treating uterine cancer are the radical abdominal operation of Wertheim, the extended vaginal operation of Schauta, Percy's operation for inoperable carcinoma, and radiotherapy with radium or Roentgen ray, or a combination of surgery and radiotherapy.

For a proper estimate of the value of these procedures it is highly essential that the statistical method or formula of Winter[1] be used, for in this manner only can a proper idea of each be determined. By this formula, which is based on the given number of patients observed, we determine the number or percentage who are alive five years after treatment. This is essential, because the operability, the primary mortality, permanent cures, and the absolute cures vary with each method.

There are two factors which contribute to the belief that cancer of the uterus may be cured by means other than surgical; first, the tendency of uterine cancer to remain localized in the pelvic cavity, metastasis being manifest only in the later stages of the disease; and second, the difference in malignancy or relative benignancy of certain types of uterine cancer. Thus we find that cancer of the fundus uteri (adenocarcinoma) is the least malignant of all cancers affecting that organ, and that cancer of the cervical canal or cervix proper (cylindric-cell carcinoma) is the most malignant. Cancer of the portio vaginalis (squamous-cell carcinoma) stands between the first two types in point of malignancy. It is for these reasons that the results attained from any form of treatment for cancer of the cervical canal are as a rule unfavorable. Cancer of the portio vaginalis and corpus carcinoma give a more favorable prognosis.

It is difficult or almost impossible to obtain accurate data regarding results from the various treatments in each of the above types of uterine cancer. As a rule cases are reported simply as cancer of the uterus, no distinction being made as to kind or type. When no such distinction is made, the reports always appear more favorable. Every surgeon of experience can recall cases of inoperable cervical cancer which he has thoroughly cauterized and curetted; and the patient remained free from recurrences, in some instances, for years. These are, as a rule, the relatively benign forms of squamous-cell carcinoma of the portio vaginalis, the type of uterine cervical cancer which helps to increase the number of cured patients after any form of treatment.

TABLE 1.—RADICAL ABDOMINAL OPERATIONS FOR CANCER OF THE CERVIX

By Whom Reported	Where Reported	No. of Patients Observed	Operability, per Cent.	No. of Operations	Primary Mortality	Cures after Five Years	Absolute Cures, per Cent.
Mayer, A. (Doederlein Clinic)	Ueber das Uterus Karcinom und die Ergebnisse seiner Behandlung mit total Extirpation nach Wertheim, Monatschr. f. Geburtsh. u. Gynäk., 1911, xxxiii, 701	211	56	118	28	31	16.7
Bovee, I.W.	Statistics of Radical Operation for Cancer of Cervix Uteri, Am. Jour. Obst., 1912, v, 66, 280	.....	.....	36	9	7	.....
Noble, G. H.	(Atlanta)	.....	.....	38	1	13	.....
Kelly, H. A.	Bull. Johns Hopkins Hosp., 1913, xxiv, 372	188	.....	82	22	18	16.5
Faure, J. L. (Paris)	Traitement du cancer du col de l'utérus par Hysterectomie abdominale, Bull. et mém. Soc. de chir. de Paris, 1913, xxxix, 1061	.....	.....	24	2	17	.....
Clark	The Radical Operation for Cancer of the Uterus, Surg., Gynec. and Obst., 1913, xvi, 255	.....	.....	26	3	4	.....
Waegeli	Le traitement opératoire du cancer utérin a la clinique gynécologique de l'Université de Genève, Rev. de gynéc., 1914, xxiii, 29	223	26.80	37	13	7	18.91
Wilson	The Results of Abdominal Operative Treatment of Cancer of the Uterus, Med. Press and Circular., 1914, xcviii, 302	98	22.5	32	9	10	10
Prochownick, L.	Behandlung und Statistik des Gebärmutterkrebses, Zentralbl. f. Gynäk., 1915, xxxix, 677	223	.....	123	25	16	.....
Peterson, R.	Tr. Am. Gynec. Soc., 1916	.....	.....	49	9	18	.....
Wertheim	International Congress of Medicine, London, 1913, Section 8, Obstetrics, p. 97	1,501	50	566 714	131 or 23.11% 119 16.67%	114 or 25.44% 186 53.5%	29
Combined		2,644	Average, 38.85	1,280	230 or 19.52%	230 or 25%	Aver. for 6 operators, 16.52

Although complete data for a computation of the relative value of each method of treatment cannot be had at this time, sufficient data are at hand to show the results of the surgical treatment, and to give us a fair estimate of the value of the others.

Regarding the radical operation as advocated by Wertheim, Ries, Werder, and others; the author[2] in 1911 published a collective abstract of the results obtained in 2,765 such operations. The figures for this operation at that time were an operability of 65.17 per cent., and a primary mortality of 19.94 per cent. The latest report obtainable from the clinic of Wertheim[3] in Vienna is that given by him at the International Congress in London, in 1913. In this report Wertheim gives his operability as 50 per cent., with a primary mortality of 16.6 per cent.; definite cures as regards the number of radical operations, 42.5 per

* Read before the Section on Obstetrics, Gynecology and Abdominal Surgery at the Sixty-Seventh Annual Session of the American Medical Association, Detroit, June, 1916.

1. Winter: Vorschläge zur Einigung über eine brauchbare Karzinomstatistic, Zentralbl. f. Gynäk., February, 1908, xxxii, 169; Ueber die Prinzipien der Carzinomstatistic, Zentralbl. f. Gynäk., 1902, xxvi, 81; Noch einmal die Carzinomstatistic, ibid., 545.

2. Jacobson, J. H.: The Results Attained by the Radical Abdominal Operation for Carcinoma of the Uterus, THE JOURNAL A. M. A., Jan. 14, 1911, p. 96.

3. Wertheim: International Congress of Medicine, London, 1913, Section 8, Obstetrics, p. 97.

cent.; definite cures as regards survivors of the radical operation, 53.3 per cent. The absolute cure of all uterine cancer patients observed, in all 1,501, was 20 per cent. On account of the European war, complete reports from all the continental clinics are not available.

In Table 1 is given a list of reports for the radical operation performed for cancer of the cervix by other operators than Wertheim, with Wertheim's results appended for comparison. Table 2 gives the results from the same operation, in cases in which the type of cancer is not stated. It will be noted that the most reliable figures are those pertaining to the number of operations performed, the primary mortality, and the permanent cures after five years. In all, there are 1,778 operations, with a primary mortality of 19.68 per cent., and permanent cures after five years of 23.46 per cent. Approximately one out of every four women operated on by the radical abdominal method will pass the five year limit.

The Schauta[4] extended vaginal operation seems to have its special indication, giving results in the hands of the most experienced which approximate those obtained from the radical abdominal operation. In this country the operation has never been extensively employed, although it is particularly indicated in obese women in whom the radical method is difficult.

Thaler[5] recently reported the results from the Schauta clinic up to the year 1915; out of 1,305 patients observed, there were 654 operations, with permanent cures after five years of 133, or 17.4 per cent. The absolute cure of all cases observed was 10 per cent. Hofmeier[6] reports ninety-one such operations, with eleven deaths, and eighteen five-year cures; while Prochownick[7] in 200 operations had twenty-two deaths, and twenty-two five-year cures. The totals for these reports are 945 operations, with 173, or 18.31 per cent., alive after five years. The operability as given by Schauta[8] averages 58.1 per cent.

From an operative standpoint recurrences following surgical operations for cancer of the uterus have heretofore been considered hopeless, but Zweifel[9] from the Jena clinic in 1914 records twenty-three cases of operation for recurrence. Thirty-one operations were performed on twenty women. Of these patients 30 per cent. are alive and free from recurrence after seven and one-half years. On the basis of this study Zweifel advocates, and properly so, a clinical control of all patients operated on for cancer, especially during the first two years. The necessity for such supervision has been emphasized by Wertheim, and also by Percy in this country.

Regarding the operation of Percy[10] now so widely employed for the treatment of inoperable forms of cancer, the method has much to recommend it. The slow dissemination of a coagulating degree of heat through the carcinomatous mass is a new principle in the treatment of cancer. With no other known method can the fixed pelvic structures be so loosened, and mobilized. The tissues following the application of a low degree of heat are literally coagulated and dissolved. The method has an operability of 90 per cent., but so far nothing can be said of the primary mortality, the permanent cures or absolute cures. The primary mortality is estimated at 50 per cent., the permanent cures after five years cannot be spoken of at this time, as no one has thus far published a large enough series of cases to form any accurate estimate of the actual curability by this procedure.

It is highly probable that were this method used in earlier cases of cancer of the uterus, the results would be more favorable. In a consideration of cautery and heat operations, one must not forget that Mackenrodt[11] developed and used a method which he designated "igniextirpation," and after a wide experience with it he abandoned the method for the radical abdominal operation. The Percy operation when properly performed is the best means at our command for the treatment of inoperable or borderline cases of cancer of the uterus.

TABLE 2.—TYPE OF UTERINE CANCER NOT CLASSIFIED

By Whom Reported	Where Reported	No. of Patients Observed	Operability, per Cent.	No. of Operations	Primary Mortality	Cures after Five Years	Absolute Cures, per Cent.
Cobb, Farrar	Boston Med. and Surg. Jour., 1913, clxxv, 85	420	36.1	55	12	7	.....
Taussig, F.	Am. Jour. Obst., 1912, lxvi, 506	...	30	60	18	14	.....
Cullen, T. S.	Am. Jour. Obst., 1912, lxvi, 506	...	.....	49	7	7	.....
Sampson, J. A.	The Radical Operation for Cervical Cancer, New York State Med. Jour., 116, xvi, 82	...	.....	25	5	4	.....
Busse, W. U. (Kroenig Clinic)	Dauerresultate bei dem Operation des Uteruskarcinoma nach den abdominalen methoden, Monatsch. f. Geburtsh., 1912, xxxv, 35	79	78.95	59	15	19	25.33
Peto, E.	Heilung des Gebärmutterkrebses mittels des Wertheimschen Operation. Virchows Arch. f. path. Anat., 1913, cxviii, 470	...	63	100	14	10	10
Hoffmeier, M.	Zur Operation Behandlung die Carcinoma Colli Uteri, Ztschr. f. Geburtsh. u. Gynäk., 1911, lxix, 543	...	.....	10	18	32	.....
Bumm, E.	Ztschr. f. Krebsforschung, 1910, x, 105	100	60	60	12	24	.....
				498	101 or 20.3%	87 or 17.47%	
				1,280	250	330	
Table 1				1,778	351 or 19.68%	417 or 22.46%	

4. Schauta: Die erweiterte vaginale total Extirpation des Uterus bei Kollemkarzinomen, Monograph, Joseph Safar, Vienna, 1908.
5. Thaler, H.: Zur erweiterten vaginalen Karzinomoperation, Zentralbl. f. Gynäk., 1915, xxxix, No. 41.
6. Hofmeier, M.: Zur Operativ-Behandlung die Carcinoma Colli Uteri, Ztschr. f. Geburtsh. u. Gynäk., 1911, lxix, 453.
7. Prochownick, L.: Behandlung und Statistik des Gebärmutterkrebses, Zentralbl. f. Gynäk., 1915, xxxix, 627.
8. Schauta: Monatschr. f. Geburtsh. u. Gynäk., 1912, xxxvi, 202; Die erweiterte vaginale operation bei Carzinoma Colli Uteri auf Grund zehnjahreger Erfahrung, ibid., 1911, xxxiii, 680.
9. Zweifel, Erwin: Dauere Folge nach Rezidivoperationem bei Uterus Carcinomen, Arch. f. Gynäk., 1914, cii, 411.
10. Percy, J. F.: Heat in the Treatment of Carcinoma of the Uterus, Surg., Gynec. and Obst., January, 1916, p. 77.
11. Mackenrodt: Ueber die Igniextirpation bei Scheidengebärmutterkrebs, Verhandl. d. Gesellsch. f. Geburtsh. u. Gynäk.; Ztschr. f. Geburtsh. u. Gynäk., 1896, xxxiv, 130.

The rapidly increasing literature on radiotherapy in the treatment of uterine cancer demonstrates that in radium and the Roentgen ray we now have powerful agents which have a favorable or curative influence on the disease. The recent articles by Boggs,[12] Case,[13] Miller,[14] Kelly and Burnam,[15] and von Franque[16] reveal the fact that a new era is at hand in the treatment of uterine cancer.

According to von Franque (1915) only three patients treated with radium have been reported who have remained free from recurrence after five years; one by Abbe of eight years, and one each by Abbe and Degrais, of six years. Of the patients with lasting cures for shorter periods mentioned by von Franque and others, the most favorable report is the recent one of Kelly and Burnam.[15] They report results in 347 patients treated by radium. They state that in early and good operable cases the use of radium combined with operation adds greatly to the ultimate cure. In twenty such cases there have been no recurrence. In 327 patients, all inoperable, 20 per cent. have been apparently cured, and in others the relief of symptoms was very marked. Bad results other than failure to cure have been reported by Bumm, Doderline and Schauta. Wertheim[17] states that out of eleven patients treated by radium, nine died from the treatment. Cases of rectal and bladder fistula resulting from its use have been reported.

The recent improvements in Roentgen-ray technic for treating cancer, that is, the Coolidge tube, adequate filters, the 9 to 10 inch spark gap, cross firing; or in other words, the ability to give larger doses of hard rays of greater penetrating power, will in all probability overshadow the former results from roentgenotherapy. Here again sufficient time must elapse before final results can be recorded.

It seems certain that the destruction of cancer cells by roentgenotherapy is an established fact. This has been proved histologically. Case[13] estimates from a review of the literature that in about 25 per cent. of the cases of uterine cancer, the temporary effect of Roentgen treatment has been satisfactory.

Von Seuffert[18] thinks that it is not definitely decided whether radium and mesothorium treatment should be given preference to Roentgen rays. The author weighs the advantages and disadvantages of each and comes to the conclusion that at present in the treatment of carcinoma of the uterus, Roentgen rays, radium and mesothorium are of about equal value. In certain cases the Roentgen rays are to be given preference, because the necessary amounts of radioactive substance for treatment without danger are at present unobtainable.

From the foregoing résumé of the methods of treatment of cancer of the uterus, it must be at once apparent that up to the present time our best results are obtained from surgical measures, more particularly the radical abdominal operation. Cautery methods and radiotherapy seem to be given a consideration in the treatment of this disease which is unfair to surgical methods of approved value.

Why cancer in one part of the body should be treated differently from the same disease in another part is difficult to comprehend, yet this seems to be the case in uterine cancer. The surgical removal of the diseased organ and the removal of the contiguous tissues together with the regional lymphatic glands are principles which are just as necessary in the cure of uterine cancer as in any other type of carcinoma.

It is therefore appropriate at this time to emphasize the necessity of giving those patients who present themselves in an operable stage the benefit of surgical treatment, a procedure which conforms to the recognized principles for the successful treatment of cancer. There is at the present time a tendency to deviate from this rule and to give preference to the methods of treatment which have not as yet given results justifying their universal application.

Combined methods of treatment, such as operation followed by the use of Roentgen ray or radium, seem most logical.

In 1908 the author,[19] in conjunction with H. W. Dachtler[20] of Toledo, Ohio, began to treat all patients systematically with the Roentgen ray after the radical abdominal operation of Wertheim had been performed. A technic for giving this treatment was devised whereby the patient was placed in an exaggerated lithotomy position, or in the knee chest position, so that the pelvis might be emptied of viscera which would have a tendency to obstruct the action of the rays. In this way irradiation was given per vagina, as well as through the abdomen, and all parts of the pelvic cavity where thoroughly treated by the Roentgen ray. These treatments were given as soon after the operation as was possible, and were continued over long periods of time. The advent of the Coolidge tube has greatly simplified this method of postoperative treatment.

The writer has performed typical Wertheim operations on twenty patients, among whom there have been five deaths. Thirteen of these patients have had systematic postoperative irradiation with the Roentgen ray. Three are alive and have been free from recurrence more than five years, two for three years, three for two years, and two for one year. We have had two cases which seem to demonstrate without question the value of postoperative Roentgen-ray treatment. The first case was a patient already reported by H. W. Dachtler,[20] operated on in September, 1907, by the abdominal method, for cancer of the vaginal portion of the cervix. In this case there was a carcinomatous infiltration into the right broad ligament which was not removed at operation. The patient was thoroughly treated by Roentgen ray after the operation and the mass in the broad ligament entirely disappeared. The patient is alive and well about nine years after the operation.

The second patient was operated on in August, 1913, for cancer of the body of the uterus with extension of the disease into the iliac and lumbar lymphatic glands. These glands were removed at operation and microscopic examination showed them to be malignant. The case was one which is generally conceded hopeless, as recurrence is always the rule. The

12. Boggs, Russel H.: The Local Application of Radium Supplemented by Roentgen Therapy, Surg., Gynec. and Obst., 1916, xxii, 358.
13. Case, James T.: The Roentgen Treatment of Uterine Carcinoma, Surg., Gynec. and Obst., April, 1916, p. 429.
14. Miller, C. Jeff: Radium in The Treatment of Carcinoma of the Cervix Uteri, Surg., Gynec. and Obst., April, 1916, p. 437.
15. Kelly, H. A., and Burnam, Curtis F.: Tr. Am. Gynec. Soc., 1916.
16. Von Franque, Otto: Ueber die gegenwartigen Stand der Strahlen Behandlung des Gebärmutterkrebs, Ztschr. f. Geburtsh. u. Gynäk., 1915, lxxvii, 244.
17. Wertheim: Quoted by von Franque.
18. Von Seuffert, Evon: Present Status, Problems and Limitations of Radiant Treatment of Cancer, Strahlentherapie, 1914, iv, 740.
19. Jacobson, J. H.: The Radical Abdominal Operation for Cancer of the Uterus, Ohio State Med. Jour., August, 1909, v, 451.
20. Dachtler, H. W.: Preliminary Report on Postoperative Roentgen Irradiation Following the Radical Operation for Cancer of the Uterus, Am. Quart. Roentgenol., December, 1909.

postoperative Roentgen-ray treatments were most thoroughly applied both through the vagina and abdomen. This patient is now in good health three and one-half years after the operation.

SUMMARY

1. In early or operable cases of uterine cancer, the best results are obtained from the radical abdominal operation.

2. Owing to the difference in malignancy of uterine cancer, the type of cancer present should be determined whenever possible.* Cancer of the vaginal portion and of the body of the uterus should be treated preferably by operation.

3. What shall be done with the borderline cases is to be determined by the operator's judgment, and his experience with the radical abdominal operation.

4. Until radium, Roentgen ray, or Percy's operation shall have proved their superiority to established methods of surgical treatment, their use should be restricted to the inoperable cases.

5. A combined form of treatment, that is, operation with radiotherapy, is a method of demonstrated value. Systematic irradiation with Roentgen ray or radium should follow every palliative or radical operation for uterine cancer.[21]

ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. TRACY, DEAVER AND JACOBSON

DR. J. H. CARSTENS, Detroit: I quite agree with Dr. Jacobson on general principles. There is only one thing I want to repeat, and that is to make an early diagnosis. Cancer has a beginning. It is so small that you cannot see it, but it finally gets as large as a pinhead, then as large as a bean, then as big as your head, and then any old woman can see and recognize it. What we want is the early diagnosis, and if there is anything that makes me disgusted, it is neglect to make a microscopic examination in every case of curetting or tear in order to get an early diagnosis. You may fail a hundred times, but once in a while you will make the diagnosis early.

So far as the other is concerned, I may be dull of comprehension when I hear my friends speak of the danger of contracting cancer by being exposed to the Roentgen rays. It is funny how the Roentgen ray can cure cancer in one case and in another case produce it. Electricity and these other forms of treatment for cancer may come and go, but surgery stays here forever. I agree with everything that has been said concerning operation for uterine fibroids. I agree with Dr. Deaver in everything he said. The only question is that fibroids do not kill immediately; you need not do the operation today or tomorrow, as in appendicitis. You can get the patient into good condition; you may give her time to consult relatives, and when everything is in good condition, then the time is propitious for successful operation. There is only one thing—and really it pained me after hearing Dr. Deaver's paper that he should talk again about hysterotomy. I have been able to diagnose pregnancy, and I do not have to cut into the uterus to find out whether a woman is pregnant. You can always make a diagnosis, but if the case is obscure you could easily make a roentgenogram and if the patient is pregnant, you may find the bones of the fetus.

DR. HENRY O. MARCY, Boston: In 1887 Apostoli was prominent because in Europe he had made a record. Mr. Keith of Edinburgh had then 70 cases of large fibroid tumors removed without a single death. He said, "Apostoli is teaching us a new faith; we shall cease to use the knife." What came of it? I asked Apostoli to operate for me in my hospital. I had seen much of the work of Drs. Kimball and Cutter sending a very powerful continuous electric current through the tumor by means of deep punctures in it with especial electrodes. This treatment proved disastrous. Although thus predicated I felt in the multiple evidence of the benefit of the Apostoli treatment I must be wrong. Therefore I purchased the expensive, troublesome apparatus and with the utmost care I recorded quite a thousand applications. Strange as it may seem, the patients all claimed to be much benefited, but I saw no improvement and abandoned its use. The experience of others corroborated my conclusions. The method fell into disuse and is now almost entirely forgotten. Electricity has been relegated into obscurity, and with most of us, into absolute forgetfulness. I can think it very probable that radium and the Roentgen ray will likewise be forgotten in their application to such growths. Deaver is a wise man; he knows a great deal that the obstetrician cannot teach him—and if you are in doubt as to pregnancy, make a roentgenogram and find out what is in the uterus. Dr. Carstens is very wise in giving this simple direction. Surgery is the only method worth discussing in this connection.

DR. HENRY SCHMITZ, Chicago: I subscribe to every statement made concerning the indications for surgical treatment of these conditions. I have done a great deal of clinical investigation with the Roentgen ray and radium. The question arises in my mind whether the attitude taken by Drs. Deaver and Jacobson is the correct one. I believe it is not going too far to say that their condemnation of these procedures has been entirely incorrect. Cancer is either operable or inoperable. When it is operable, it is, under all circumstances, a surgical disease. When it is advanced beyond the reach of surgery it becomes inoperable and then the Roentgen rays and the gamma rays of radium are indicated. Under these circumstances the rays will ameliorate the patient's condition better than any other therapeutic agent known. Radium is indicated in cancer of the uterus only when the condition is entirely inoperable. Many cases of inoperable cancer of the uterus become operable under radium treatment. The surgeon must then remove the uterus to give the patient the benefit of surgery. Not every case of myomatous uterus is operable. It is in the inoperable fibroid that Roentgen ray or radium rays are indicated. The result of the use of the rays is almost always a clinical cure. From my personal standpoint, then, if tumors of the uterus are operable, they must be subjected to surgery and in this I heartily agree with Drs. Deaver, Tracy and Jacobson. But when they have become inoperable, then the Percy heat method, the massive Roentgen ray or radium rays are the remedies to be recommended.

DR. FLORUS FREMONT LAWRENCE, Columbus, Ohio: I want to emphasize as strongly as I can everything Dr. Deaver said. A man who advises a woman with myoma, fibroma, or any other kind of neoplasm, "to let it alone, that it won't give her any trouble," ought to be handled very severely by his medical society, if not elsewhere. Any neoplasm may become malignant and many do. In one series of 100 cases of hysterectomy for fibroids done at my hands, we found that fourteen were undergoing sarcomatous or carcinomatous degeneration. In others it was as low as two per hundred, thus making an average of something more then five per hundred undergoing malignant change. At New Orleans I demonstrated my method of supravaginal hysterectomy for fibroids. The tumor is delivered through the abdominal incision. Then by placing rope about the base of the tumor the broad ligaments are clamped to the side of the stump. The peritoneal covering of the uterus is incised and pushed down before and behind. Then the tumor is removed by a V incision, the apex of V being down. One ligature on each side secures both ovarian and uterine vessels. Not a drop of blood has been lost from the patient, and only a slight

21. In addition to the references already given, the following will be found of interest:
Wiebel, W.: Die Klinische Stellung des Carcinoma Corporis Uteri, Arch. f. Gynäk., 1913, c, 135.
Peterson, R.: Primary and End Results of Fifty-One Radical Abdominal Operations for Cancer of the Uterus, Surg., Gynec. and Obst., 1916, xv, 135.
Von Franque: Ueber den gegenwartigen Stand der Strahlenbehandlung des Gebärmutterkrebses, Ztschr. f. Geburtsh. u. Gynäk., 1915, lxxvii, 244.
Von Ott: Die operativen Behandlungmethoden des Gebärmutterkrebses u. d. dabei erzeilten Resultate, Berl. klin. Wchnschr., 1913, L.
Taylor, Howard Canning: The Radical Operation for Carcinoma of the Uterus, Surg., Gynec. and Obst., January, 1916, p. 70.

venous bleeding from the tumor mass. When you have sutured over the stump you have reformed the convex pelvic roof instead of making a concave one, and a minimum amount of suturing is required. There is no loss of blood, no shock, and the patient is as free from all postoperative trouble as after a simple ovariotomy.

DR. CHESTER M. ECHOLS, Milwaukee: In our enthusiasm to cut something out, especially if it be a tumor which might become malignant, I think we are apt to overlook the definite indications for myomectomy as opposed to hysterectomy or supravaginal amputation. I admit that the indications are not present in the majority of cases, but in young married women there should be left undisturbed the function of childbearing and of menstruation if at all possible. In my student days I was taught that myomectomy was more dangerous than hysterectomy because of the possibility of bleeding and other complications. My experience in a considerable number of myomectomies has convinced me that its indications are often overlooked. One case illustrates quite a class: Two and a half years ago the wife of a prominent physician in our city was desirous of having children. Because of the presence of multiple fibroids of moderate size she was advised to have a hysterectomy. I examined her and advised that she have a myomectomy done, which she did. She is now the happy mother of a three or four months old baby. It is interesting to note that careful examination shows that there has been no recurrence of tumors, not even to the size of a cherry. Hysterectomy can always be done as a last resort in case of recurrence of the tumors, and it is an operation practically devoid of danger.

DR. J. A. RUBEN, Pittsburgh: If the use of Roentgen rays and radium in the treatment of malignant diseases or tumors of the uterus can be considered malpractice, then the use of any new remedy, not universally accepted, must be considered malpractice. Regarding the old idea of Roentgen rays causing cancer, it may be said that the earlier roentgenologists who sacrificed their lives trying to develop something new that would relieve or cure disease did so in ignorance of the physical character of the force to which they exposed themselves and their patients. They did not know that the Roentgen rays and the rays of radium could be divided into soft, medium and hard rays. The soft rays have so little penetrating power that they can be stopped by a sheet of paper, and are mostly responsible for the burns of both patients and operators. On the other hand, the hard rays have such power of penetration that they may pass through armor plate; these cause little or no injury to normal tissues, even in very large doses. Of the pioneers, in this work, probably some will die of cancer—some have—but today we understand better what we are handling. With the use of the radiometer for measuring the Roentgen ray doses and with standardized technic (3 millimeter thickness of aluminum or lead as filter), even in the treatment of deep seated conditions, our patients suffer no harm. The operator also, with modern protection, standing behind a leaded wall, can feel perfectly safe. Finally, a number of gynecologists are now doing this work themselves, and under their own careful observation, can soon distinguish those cases unsuitable for radiotherapy, and in sincere honesty, advise a timely operation.

DR. STEPHEN E. TRACY, Philadelphia: I do not believe that all fibromyomata uteri should be treated by surgery, nor do I believe all should be treated by roentgenotherapy. I question the sincerity of the man who claims he can cure all such tumors, except those removable by vaginal myomectomy, by roentgenotherapy. I agree with Dr. Schmitz that some cases should have roentgenotherapy. Dr. Pfahler will not treat a case of fibromyomata uteri unless referred to him by a surgeon; he wants to know what he is treating. In fibromyomata uteri associated with malignancy, I believe that early radical operation will give the best results. Formerly, Roentgen treatment for malignant disease in the female pelvic organs was practically useless. Now, roentgenologists claim that with a better technic, more powerful machines, and a competent operator, much may be accomplished in these cases. In view of these claims, it would seem that better results should be secured in cases of fibromyomata uteri associated with malignancy if the radical operation be followed by systematic Roentgen treatment by a competent operator, the same as is done in carcinoma of the breast and in other superficial malignancies. I have never seen a case of fibromyomata uteri in which I was afraid to operate, and my mortality does not indicate that I have been reckless. All my patients have been studied carefully, and in some cases it has taken weeks, and in a few even months to get the patient in a sufficiently good condition to undergo an operation with a reasonable hope of a satisfactory result. I agree with Dr. Carstens that material removed by the curet should be examined microscopically. Dr. Lawrence referred to his method of hysterectomy. This will no doubt work out well in some cases, but to use such a technic, it is necessary to have cases made to order. His technic cannot be carried out in large intraligamentous nodules, or in tumors associated with inflammatory lesions. I fully agree that the cervical stump should be sutured to the infundibulopelvic and round ligaments. This we always do, but with a different technic. Dr. Echols spoke of myomectomy. In the paper I stated that we should know the age at which the degenerations take place in these tumors in order to decide whether we should do conservative or radical surgery. In women under 40, if possible, a myomectomy should be done, after 40, as a general rule, on account of the changes in the uterus and tumor, a hysterectomy is the better operation.

BACTERIAL VACCINES IN TREATMENT OF PULMONARY TUBERCULOSIS

IMPRESSIONS AS TO CLINICAL VALUE*

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Although I have had opportunity to note the apparent effect of vaccine therapy, independently of tuberculin, in a large number of cases, I will submit merely a preliminary statement of general impressions derived from clinical observation.

Do bacterial vaccines exert an influence for good in pulmonary tuberculosis, and, if so, under what conditions and with what restrictions?

Are they capable of doing harm, and if so, what precautions should be observed in, and what are the special contraindications for their use?

My position, from the data thus far obtained, is that:

1. Vaccine therapy should by no means be permitted as a routine measure in the treatment of tuberculosis.
2. It has a legitimate place as a tentative procedure in a class of cases subject to certain modifying limitations.
3. Careful adjustment of dosage is vitally important.
4. The number of pulmonary invalids for whom vaccines are prope.ly applicable is comparatively small.
5. The results obtained are very uncertain.
6. The proportion of those exhibiting improvement is disappointing.
7. The gain established in a few is sometimes impressive.
8. Vaccines not infrequently are shown to possess vast possibilities of injury.
9. Finally, the attitude of the profession should be one of the utmost conservatism.

It may be added parenthetically that the foregoing statements seem to be true, to a certain extent at least, of tuberculin therapy.

* Read before the American Climatological Association at the Annual Meeting, Washington, D. C., May 10, 1916.

Apropos of these rather definite opinions, attention should be called to the not infrequent delusion regarding the efficacy of this treatment, to the indiscriminate administration of vaccines for nearly all classes and conditions of pulmonary tuberculosis, and to the deplorable results occasionally noted from the abuse of an agent which, intelligently employed, may become at times of genuine value.

A single case may serve as an illustration of the careless empiricism displayed in the use of bacterial vaccines.

Case 1.—A woman, aged 32, came under my observation in June, 1915, presenting the history of a tuberculous infection seven years previously. Since that time she had visited various health resorts and sojourned in several sanatoriums, submitting to tuberculin medication for prolonged periods, as well as to the administration of bacterial vaccines, with subsequent unfavorable results. She came to Colorado two weeks after a rather severe hemorrhage, exhibiting loss of weight, very considerable elevation of temperature, dyspnea and occasional chills and night sweats. There were physical evidences of active tuberculous involvement in the right lung from the apex to the third rib and to the lower edge of the shoulder blade. There was also active involvement in the left lung. Tubercle bacilli were numerous in the sputum. For months the tendency had been that of a progressive decline. In the face of these clinical manifestations and physical signs, the patient was being given, at intervals of from one to three days, a stock vaccine containing six different micro-organisms. No culture had been taken of the sputum and hence no information had been obtained as to the nature of the infection, yet the patient was provided with an elaborate outfit and directed to have her physician or nurse administer the vaccine in accordance with instructions received.

As there was no clinical or bacteriologic basis affording the slightest justification for this treatment, it was promptly suspended, and the patient was committed to a systematic regimen in accordance with conservative methods. In ninety days the fever was under complete control and there were other evidences of marked clinical improvement, including a gain in weight of 15 pounds and a pronounced lessening in the activity of the tuberculous process.

The development of unfavorable symptoms following the use of bacterial vaccine should always demand its prompt discontinuance.

In this connection it is interesting to note a similar illustrative example of the misuse of tuberculin:

Case 2.—In May, 1915, a patient from one of the large Eastern cities presented a letter of introduction from an active practitioner who described the condition, reported the use of an autogenous vaccine and directed that at regular intervals 3.5 mg. of Koch's old tuberculin be given.

Examination of the chest disclosed the presence of an active and extensive tuberculous involvement in the left lung, moist râles being recognized from apex to base. The sputum was literally peppered with tubercle bacilli. It is almost unnecessary to state that the tuberculin was discontinued and the patient put in bed. The temperature has since been normal, he has gained 35 pounds in weight, the cough and expectoration have entirely disappeared, and physical examination reveals but an occasional semidry click just outside the left precordial region.

Can any one fail to recognize the relation of cause and effect in such instances as these?

It is possible that the popularity of bacterial vaccines as a conventional measure for pulmonary disease has not been as frequently observed by other clinicians in health resorts. In this event, my impression as to their widespread employment before resorting to climatic change must be regarded as one of the anomalies of my experience. While the detrimental effects of injudicious specific medication are not always so conspicuous as in the cases cited above, evidences of an unfavorable influence are not wanting in my own cases, as shown by occasional chills, elevation of temperature, increase of cough, malaise, or varying degrees of prostration. While these disturbing manifestations may of course be attributed to improper dosage and, therefore, are capable of later amelioration or suppression, a happy adjustment of size and frequency of injection is not always to be attained. In the absence of precise laboratory methods to control their use, the results of their administration, especially under present methods of preparation, inevitably become a matter of extreme uncertainty. As usually prepared, even by those well equipped for this work, there is no positive assurance that the micro-organisms constituting the vaccine are identical with those chiefly responsible for the infection and its consequences in the individual. Cultures taken on successive days with equal care do not always furnish the same results. The use of vaccines representing the isolation and incorporation of several varieties of micro-organisms is necessarily subject to still greater hazards. Notwithstanding accurate standardization, the clinician in such instances possesses no means by which to adjust separately the dosage of the several component ingredients. While a degree of immunity may thus be established for one infection, no corresponding influence is exerted on the others. It is entirely possible that, owing to modifying influences pertaining to the host and to important changes in the invaders incident to environment and adaptation, certain constituents of the vaccine may later become not only useless but actually harmful by prolonging the negative phase and lessening individual resistance.

It would appear that the use of several separate vaccines, each consisting of but one type of micro-organism, would only add to the confusion, because of the difficulty of such an interspersing of doses, in allowing opportunity for clinical deductions.

In these cases the work with the complement fixation test is of interest and worthy of commendation. It is perfectly conceivable that in some instances the information obtained by this means may be of the utmost value. This has been well shown recently in two of my cases, in which the patients exhibited an obscure fever with other symptoms suggesting tuberculosis, which caused their removal to Colorado. In both instances the infection was shown by the complement fixation test to be gonococcic in nature and was favorably influenced by vaccine therapy. Some difficulties, however, are at present encountered in employing this test to ascertain the predominant secondary infection in pulmonary tuberculosis.

It should perhaps be recognized that embarrassment may result from the existence of intercurrent complications. An influenza or other infection, perhaps of remote origin, may yield a positive response on exhibition of the complement fixation test and yet be without especial significance as regards the lessened individual resistance occasioned by another secondary infection. Thus in some cases it may be impossible to conclude that a positive test from one organism affords any direct information as to the infection from which the patient is actually suffering. Furthermore, even in the presence of a positive test, the lack of definite control renders it impossible to measure with any degree of accuracy the extent of the immunity established.

As illustrative of some of these considerations the following case is of some interest:

CASE 3.—In March, 1913, a patient came to Colorado fifteen months after the development of initial pulmonary symptoms. There was great loss of weight, prostration, fever, dyspnea, cough and expectoration, with well defined physical signs in each lung, and especially active involvement of the left. As a result of rest in bed and other rational measures and, without recourse to specific medication, a gain of 36 pounds resulted in the course of eight or ten months, with corresponding change for the better in all the clinical manifestations, including the physical signs. The improvement finally ceased, and was followed by a stationary period for several months, at the end of which a vaccine, prepared in ampules by Drs. Simon and Burdick, appeared to be of very substantial benefit in diminishing the cough and expectoration and lessening the moisture in the left chest. The vaccine was exhausted at the end of about three months, and a culture taken at that time disclosed an entirely different type of infection. Another vaccine was prepared by Dr. Burdick and, although administered for two or three months in steadily decreasing doses, exerted an apparent unfavorable influence, whereupon its use was suspended. After several months without appreciable change in the general condition of the patient, culture of the sputum revealed a still different combination of infections, and a vaccine was prepared by Dr. Waring. This seemed at first to have a beneficial effect, but later became apparently inert.

It is possible that in such an instance the information to be obtained from the use of the complement fixation test might prove of definite value. It is also suggested by this and other experiences that the effects produced by bacterial vaccines may be merely relative and the improvement but transitory, even though for a time an apparent increase in the defensive resources is developed. Desirable as it is to avoid the production of a reaction in such cases, an indication of tolerance is not necessarily an evidence of acquired immunity and is quite insufficient to justify an assumption as to the benefits afforded. Similarly, the absence of unpleasant symptoms does not always suggest the wisdom of continued increase of dosage, but the nature of the clinical manifestations may represent important contraindications.

In this connection especial attention should be devoted to the condition of the kidneys. In many instances these organs are already overtaxed in the effort to eliminate toxins incident to the tuberculous and mixed infections, especially those of streptococcic origin. An additional burden is often imposed by an injudicious attempt to increase largely a protein diet. Under a prolonged continuance of these conditions the administration of vaccines in large doses may be responsible for urinary findings indicative of further injury to the renal tissue.

Amid the obscurity involving many features of vaccine therapy and the inherent difficulties owing to the possible complicating conditions in pulmonary tuberculosis, arbitrary conclusions seem unwarranted. Provisional opinions are permissible only when possibilities of error are eliminated to the fullest extent. When the employment of bacterial vaccines represents simply the introduction of a new element in the therapeutic regimen, all other conditions remaining approximately the same as before its use, it may be fair to assume a causal relation. Thus, sources of confusion, and doubt as to the value of this or any other medicinal agent must obtain, if administered to invalids shortly after radical climatic change, the physiologic influence of which may overshadow the effect of specific medication.

In like manner incorrect deductions are unavoidable, in the event of a coincident change of management or mode of life. In order to minimize the uncertainties of clinical opinion as to their value, it is essential that vaccines be used only in carefully selected cases, preferably those conforming to a rigid regimen for a considerable period without change of climate or environment. The conclusions thus afforded are made still more reliable if the application of this agent is limited to patients whose condition has become more or less stationary with the ultimate prognosis somewhat doubtful. In the absence of a definite progressive tendency in either direction, the development of a substantial clinical change following its use cannot be entirely disregarded. There exists no valid excuse for giving vaccines to patients who are doing well, and but little encouragement for a proper interpretation of results if given to those who are rapidly declining. While vaccines would seem especially appropriate for those exhibiting unsatisfactory progress, yet not entirely hopeless, it is not always possible, even in these cases, to attribute an improvement solely to the specific medication.

In addition to the remedial agent two factors may contribute quite materially to this result, the psychic element, which is worthy of practical consideration among pulmonary invalids, and the opportunity presented for closer observation and more careful direction. Even the fact of a demonstrable gain following the use of bacterial vaccines affords no actual criterion in all cases by which to estimate its specific medicinal effect. In the midst of the discouragement and pessimism engendered by periods of deferred hope, the moral uplift from the thought that something is being done is sometimes quite remarkable. An improved mental attitude, a better appetite and digestion and an increasing spirit of cooperation ensues. The more frequent contact of physician and patient, the influence of which is far-reaching, results in mutual sympathetic relations productive of earnest, interested effort on the part of each. Faithful compliance with instructions is thus secured and a correspondingly greater medical efficiency. Caution should be exercised, however, lest following the initial enthusiasm, the physician permit himself, in the frequent routine of vaccine administration, to devote insufficient attention to important details of management which constitute the very essence of any success to be obtained. The tendency under such circumstances to drift unconsciously from the recognized features of personal control may be quite pronounced. If this is carefully avoided, and due advantage taken of the facilities afforded for more detailed supervision, it is quite conceivable that distinct benefit may accrue from vaccine therapy, quite irrespective of its specific action.

The cautious employment of bacterial vaccines, as previously stated, would seem to be appropriate chiefly for persons who failed to show satisfying improvement under conservative management. I have restricted its use largely to this class of patients, as I could not consistently subject an invalid presenting every reasonable assurance of eventual recovery to the active influence of a therapeutic agent of uncertain value. It does not follow, however, that vaccines are indicated for all patients who are doing poorly. Such a broad classification would include not only those who, on account of the advanced infection, are clearly doomed to a fatal termination, but also others whose retardation of progress may be ascribed to important, though not

hopeless complications, or to the development of disturbing conditions capable of amelioration under resourceful management. In many of these cases the unfavorable factors are so apparent as to suggest change of environment, removal of adverse influence, a more generous and appetizing cuisine, added opportunity for physical and mental repose and closer attention to other details, rather than to an abrupt recourse to a doubtful form of medication. In the absence of other pathologic conditions, in themselves explanatory of unsatisfactory general progress, and demanding special remedial measures, it may be granted that a demonstrated inability to respond favorably to an intelligent regimen suggests the expediency of specific therapy. In my earlier experience with vaccines, their application was largely confined to far advanced patients exhibiting a relentless decline with pronounced septic manifestations. All of these, by virtue of every consideration ordinarily influencing prognosis, were regarded as hopeless. In many of the cases, the course of the disease was uninfluenced, but in a few, definite improvement was noted, while in one or two conspicuous instances the clinical picture was unexpectedly transformed. On the whole, the results obtained in this class of cases have been extremely disappointing, and the impression has been received that but little if any encouragement is afforded from vaccine therapy under such conditions.

It would seem that the elaboration of protective substances within the individual from the introduction of a bacterial agent is most unlikely when, in approaching terminal states, the natural powers of defense have become exhausted. It is altogether probable that at such a time the machinery of immunization is inoperative because of the flooding of the blood with bacterial products without capacity for resulting formation of antibodies. When therapeutic stimulation of the active protective processes is thus impossible, an attempt toward the development of passive immunization by the injection of antibodies contained in the serum of immunized animals is justifiable, although likely to be of little avail owing to the difficulties of proper serum identification.

Notwithstanding the very proper objection to the rationale of this procedure, the fact remains that clinical experience has furnished evidence concerning its value in rather a small proportion of cases.

The fever of pulmonary tuberculosis, exclusive of the previously mentioned septic infections in advanced cases, may represent, more than any other feature of the disease, a possible indication for vaccine therapy. A persisting elevation of temperature, independent of the nature and extent of pathologic change, represents an insuperable obstacle to recovery, and hence the application of therapeutic measures for its control is especially significant. It is necessary, however, to discriminate with the utmost care between the fever of mixed infection and that dependent on other causes. It is, of course, absurd to expect benefits from bacterial vaccines when the fever is due to such unrecognized conditions as a pleural effusion, malaria or miliary tuberculosis. Instances of this kind are by no means infrequent, as well as obscure gallbladder infections, chronic appendiceal involvement, sinus disease, cystitis and colon infection of the kidneys. A recent experience has been particularly instructive in that the fever of a young man, shortly after arrival in Colorado, with pulmonary lesions, was found to be produced by paratyphoid B. infection. This information was acquired only after blood cultures, several Widal tests and an examination of the spinal fluid had elicited negative results, and the nature of the clinical manifestations had suggested a reasonable doubt as to the possible causal relation of a mixed infection, despite the detection of the secondary micro-organism in the sputum.

Elevation of temperature is not necessarily attributable to the accompanying bacteria of mixed infection. That absorption of the toxins of the tubercle bacillus may be responsible for fever in some cases is generally accepted.

While the secondary bacteria of mixed infection may play an important rôle in the development of the pathologic processes common to tuberculosis, and exert an influence on the clinical characteristics of the disease, similar constitutional manifestations may exist without recognition, after repeated examinations, of the specific micro-organism in the sputum or blood. Even the detection of the accompanying bacteria in the sputum is not of itself sufficient to confirm an assumption that the mixed infection is the sole responsible cause for the clinical symptoms. Their presence at least affords no reliable measure of the severity of the infection and the relative gravity of the situation, which for practical purposes is best estimated by the extent of temperature elevation. The expulsion of bacteria with the tuberculous sputum, in the absence of unfavorable clinical manifestations, is no indication for the employment of bacterial vaccines. Even when apparently characteristic evidences of mixed infection are present, an element of real doubt as to the propriety of vaccine therapy is unavoidable as the syndrome may, after all, be of essentially tuberculous origin. Irrespective of these considerations as to pathogenesis, and with a just appreciation of the inevitable uncertainties of action, it appears, nevertheless, permissible to resort to vaccine therapy under the conditions enumerated.

In my experience, the results obtained in a fair proportion of cases in which there was moderate fever have been such as to encourage its further cautious employment. No assurances as to its probable effect can be given, and patients should be made to understand that its use is largely experimental. Under a wisely directed management they have but little to lose from its trial and perhaps something to gain.

This is also true to a large extent in connection with its employment in afebrile cases. While the greater proportion of such invalids may be expected to make fairly satisfactory progress under proper supervision without recourse to vaccine therapy, occasional indications for its administration may be found in patients with distressing cough and abundant expectoration. Many of these cases without fever exhibit more or less cavity formation or bronchiectasis with varying degrees of fibrosis. Under these conditions, even if but slight loss of weight has taken place, the constructive change is necessarily slow, while, if nutrition is seriously impaired, the difficulties of successful management are very considerable. The application of vaccines to patients of this class is quite appropriate and the results are sometimes gratifying. Did opportunity permit I could cite numerous cases under my own observation in which the vaccines proved of appreciable benefit and could present in person a few rather exceptional instances of the remarkable improvement sometimes achieved. Notwithstanding these decidedly picturesque examples, which though impressive are

infrequently observed, the fact remains that my own clinical experience suggests for vaccine therapy but a limited field of usefulness. As a routine method of treatment in pulmonary tuberculosis it cannot be too strongly condemned. As a special measure of occasional value, but often of doubtful utility, it appears worthy of a judicious trial in selected cases.

Steadman Building.

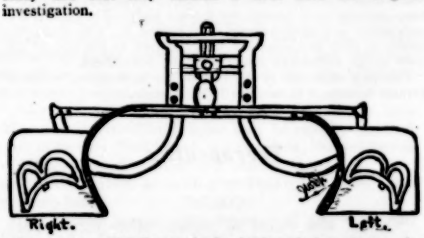
New Instruments and Suggestions

A SEMICIRCULAR CANAL INDICATOR

OF AID IN MAKING THE ROTARY AND CALORIC TESTS OF THE VESTIBULAR APPARATUS

J. W. DOWNEY, JR., M.D., BALTIMORE
Surgeon, Baltimore Eye, Ear and Throat Hospital; Associate in Otology, University of Maryland, School of Medicine and College of Physicians and Surgeons

After the examination of a large number of patients drawn from the neurologic clinic of Dr. A. C. Gillis at the Mercy Hospital, and from my otologic clinic at the Baltimore Eye, Ear and Throat Hospital, Dr. Gillis and I feel that the vestibular tests of Bárány are worthy of the most elaborate study and that they furnish a wide field for original investigation.



Semicircular canal indicator; the drawing is made from the rear view of the trial frame with the bows folded.

We have assured ourselves that in normal persons the reactions to the rotary and the caloric tests will come through simply and conclusively. Therefore, we believe that abnormal reactions are undoubtedly due to some interference in the course of arcs whose complexity have, so far, baffled demonstration.

We accept the postulate of Randall and Jones of Philadelphia, that the fibers from the different semicircular canals have entirely separate tracts of their own, and we have corroborated their findings to our own satisfaction in a series of cases on which we hope later to report. We believe, therefore, that it is of the utmost importance to make the rotary tests with the patient's head in such positions as will bring into horizontal plane the various pairs of canals, for it is only in this plane that stimulation can be aroused by rotation, and the caloric tests with the canals in the vertical position, for similar reasons.

The mental concentration necessary to carry the impression of so many factors is sometimes distracting in the general summing up of our findings. I have, therefore, devised this semicircular canal indicator, which consists of models of the canals mounted on the bows of a trial frame. With the trial frame fitted to the patient, the canals are in approximately the correct position, and a glance will show the ones that are being acted on by the rotation, or the douching, in any position of the head. Strong plus lenses, suggested and used by many observers, the more carefully to study the nystagmus, may be used in the trial frames. A *blickfixator* modeled after that of Bárány may also be attached.

I feel that this indicator has the advantage over the Brünings *otogonimeter* in that it is not in the way in any position it may be desired to place the patient's head, and though, perhaps, not so accurate mathematically, it is vastly superior in demonstrating the position in space of the various canals to those who are not constantly visualizing the anatomic peculiarities of the internal ear.

529 North Charles Street.

CUTANEOUS TUBERCULIN TEST BY PUNCTURE WITH A SOLID NEEDLE

D. A. CRAIG, M.D., LONDON, ONT.
Superintendent, Queen Alexandra Sanatorium; Chief of Tuberculosis Division, Institute of Public Health, London, Canada

In tuberculosis dispensary work in the examination of contact cases, the various skin tuberculin tests have proved of considerable value, particularly in children. Some time ago, Dr. H. W. Hill of the Institute of Public Health here began vaccinating against smallpox by means of puncture with a solid needle through a drop of vaccine. His method was successful, and the detail of the procedure has been reported.[1]

The cutaneous tuberculin tests have been extensively used in our city dispensary, and it was decided to try the skin test by puncture through a film of tuberculin. After trying a large number of cases side by side with the von Pirquet test and also a number of definite open cases, we have come to the conclusion that the puncture test has many advantages, and we are using it constantly in our work.

For the test, pure undiluted "O. T." is used. For the control, we have used glycerinated broth, as it approaches most nearly the basic principle of the tuberculin. For making the puncture a solid needle is used, preferably an ordinary sewing needle. The procedure of the test is as follows:

The skin of the forearm is washed with soap and water, dried, and alcohol or ether is applied and allowed to dry. A thin film of the control solution is placed on the skin, and a series of small punctures made through the film obliquely with a sterilized sewing needle. The punctures should be quite superficial, and in no case should the operator draw blood. Only the extreme tip of the needle is introduced. A film of pure "O. T." is placed on the skin 1½ inches below the control area, and punctures are made through this in a similar way. Six punctures in a space one eighth of an inch square are sufficient. A circle may be drawn around the area with a flesh pencil or pen, and each area marked. The test areas may then be entirely wiped off, as it is not necessary to allow the tuberculin or control to dry. The reaction is produced in this test by the slight amount of tuberculin which is carried under the superficial layer of the skin by the point of the needle, and not by the tuberculin on the surface. Reaction, when present, usually occurs in from twelve to forty-eight hours, and is marked by an infiltration of the tuberculin area. The patient should be instructed not to wash the arm until the test has been observed.

This is in reality a modified intradermal test. In a large number of cases which we have tested, the control entirely disappeared; and when the test is negative, were it not for the marking by the skin pencil or pen, one would be unable to find the test areas. The advantages which this test seems to hold are that the traumatic tissue reaction is extremely slight, and the personal factor of scarification, as in the von Pirquet test, is largely done away with. This is proved by the fact that no evidence of the control can as a rule be found the day following the test. The procedure is painless when properly carried out, and the patient does not have to wait until the film dries, thus saving considerable time. Moreover, the patient cannot rub off the tuberculin or infect the tested areas. In conclusion, one would caution that the tuberculin from the tuberculin area be not transferred to the control area by means of the needle or the absorbent cotton used in wiping off the tuberculin. The same needle or

1. Hill, H. W.: Canad. Med. Assn. Jour., March, 1916.

sterilized cotton may be used for each puncture area, provided the control is punctured or wiped first.

So far we have been successful with this test, and we are hoping that it may prove of advantage to the clinician, particularly in the examination of children.

A NEW NEEDLE FOR SUTURING PURPOSES

WILLIAM C. SPEIDEL, A.B., M.D., SEATTLE

The instrument illustrated herewith is self explanatory. The advantages of a double pointed needle are obvious. Among them may be mentioned:

1. Time is saved, in that it is only necessary to seize the needle once on inserting it and once on withdrawal and reinsertion.

2. Action is facilitated in the angles which are so frequently encountered in deep suturing, as the gallbladder, and pelvic and general abdominal work whenever a curved needle is indicated.

3. In intestinal suturing where a purse string stitch is desirable, it finds particular service; for example, in a Czerny-Lembert it can be worked with clocklike precision, requiring an easy to and fro movement, through and right back again, a straight form of needle being employed here.

4. The difficulty in utilizing short ends of suture is reduced to a minimum, and proves a saving of catgut or other material.

5. It is simple. It may be seized at either end and suturing continued without inconvenience or interruption.

Needle for suturing: above, straight needle, showing the eye toward one end; in the middle, curved needle, showing eye in the center; below, needle in the act of being reinserted.

An objection that may be offered is the danger of glove puncture. But here let me emphasize the importance and good practice of keeping the hands out of a wound as much as possible, the needle being properly handled only with forceps.

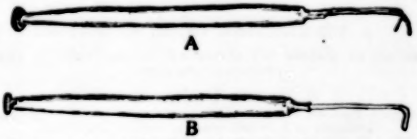
The fact that we have an additional point to attend to is more than offset by the evident and practical advantages already set forth.

519 Cobb Building.

INSTRUMENT FOR REMOVING FOREIGN BODIES FROM THE NOSE

CHARLES H. CARGILE, M.D., BENTONVILLE, ARK.

This instrument is helpful in removing foreign bodies from the nose. It is composed of two parts or shafts. One is smaller so as to pass through the other hollow one and rotate within it. The distal extremity of each terminates in a very delicate hook very like a strabismus hook. These are so adjusted that when closed they lie in lateral apposition with a combined thickness not greater than that of a strabismus hook.



Instrument for removing foreign bodies from the nose: *a*, open; *b*, closed.

The proximal end of the smaller shaft projects slightly beyond that of the larger hollow one, and terminates in an enlargement to be grasped by the fingers during rotation.

In using, the hooks are carefully slipped closed (rotated into lateral apposition) along the septum or lateral wall of the nasal passage until beyond the foreign body. Then the whole instrument is slightly rotated until behind it. This done, the hooks or tines are separated in proportion to the size of the body to be withdrawn along with the instrument.

The only objection is the cost of the instrument, which is greater because it is necessarily hand made.

Therapeutics

"COLDS"

"Colds," also called by various other names, such as coryza, acute rhinitis and acute nasopharyngitis, are without doubt the most common and least severe of all infections. As a rule, "colds" occur in epidemics, almost always being contracted by one person from another. Perhaps the commonest way of spreading is by sneezing, in which manner the agents of the infection are disseminated into the surrounding atmosphere. Aside from this, experiments have demonstrated that there are organisms residing in the nasopharyngeal passages which may produce the infection in others by inoculation.

Tunnicliff,[1] in the acute and chronic forms of rhinitis, isolated an anaerobic gram-negative bacillus, which she named the *Bacillus rhinitis*. In a large percentage of cases this organism was found in pure culture. It was also found in about 90 per cent. of the cases of chronic rhinitis in which there was a mucoid discharge. That this organism was the etiologic factor in acute rhinitis was shown by the production of the condition after experimental inoculation and by recovering the organism in pure form from those infected by the inoculation. Kruse,[2] working along the same lines, was able to demonstrate that when the secretions from the discharge in cases of acute rhinitis were taken and diluted even as much as twenty times, and then filtered, the filtrate inoculated into the noses of healthy people produced typical cases of acute rhinitis. As a result

1. Tunnicliff: Jour. Infect. Dis., 1913, xiii, 283.
2. Kruse: München. med. Wchnschr., 1914, lxi, 1547.

of this he concluded that the acute rhinitis was caused by an invisible and filterable virus, since the filtrate when cultured remained sterile.

More recently Foster[3] repeated Kruse's experiments and obtained similar results. He, however, went further, and, using Noguchi's method for growing the parasite of rabies and the organism of poliomyelitis, was able to obtain from the filtrate an organism which, when inoculated into the noses of eleven soldiers, produced a typical condition of acute rhinitis in all of them. Cultures made from the nasal secretions of these also showed the same growth on mediums. Foster, examining the growth under the dark-field microscope, states that there were "myriads of extremely active minute bodies occurring singly, in pairs and in agglomerations of varying magnitude. These did not stain satisfactorily with the usual stains."

As a rule, for the development of a "cold," the soil on which the infective agent will grow, that is, the nasopharyngeal passages, must first be prepared. This is usually effected by the exposure of the individual to varying changes in the temperature of the atmosphere by which the person is surrounded. Thus, it is still commonly believed by some that drafts per se, alone, are responsible for the "cold," or that it is produced in persons whose feet become cold or chilled from the cold or damp ground. Probably there is a dryness of the throat and nasopharynx, and as soon as the normal protecting nasal secretions are absent, the infecting organisms obtain a foothold, and the characteristic symptoms follow.

Although some "colds" may be more severe than others, and even though some may be readily aborted, even in twenty-four hours, nevertheless, the symptoms in all cases at the onset are usually the same. The incubation period, according to Foster,[3] is from eight to thirty hours.

The "cold" begins with dryness of the nose and throat. As dryness produces considerable irritation, there is a frequent desire to sneeze. At this stage, recovery may occur after a few hours rest. As a rule, this stage is followed by slight constitutional sensations of an uncomfortable nature. There may be chilliness and flushing, and a slight rise in temperature, as high as 100 F. The dryness is followed by a congestion of the nasal mucosa, with swelling. The nose feels blocked and stuffy. The sense of smell is lost, and even the taste may be abolished, or perverted. There is also present a dull headache over the frontal sinuses, and a heaviness of the head. In a few hours, or usually on the day following the onset, there appears a marked nasal discharge which seems to flow incessantly. This discharge is thin and watery, and of an irritating nature, and results in an eczematous condition and soreness of the nares and the alae nasi.

The inflammation may spread to the eyes, the conjunctivae of which become reddened and inflamed, and the eyes feel hot and irritated. At times the infection, or at least the irritation, will extend up the eustachian tubes to the middle ear, and will produce tinnitus aurium, with slight deafness. Tonsillitis and bronchitis often follow in the wake of acute rhinitis. By the time that this occurs the original inflammation may begin to subside, the symptoms of the rhinitis persisting from three to six days.

3. Foster, G. B.: The Etiology of Common Colds, THE JOURNAL A. M. A., April 15, 1916, p. 1180.

There may be a mixed infection in which some organisms other than the one which produced the primary symptoms will predominate. When this occurs, the discharge will change from a thin, watery one to a mucopurulent, or even to a purulent discharge of a dirty greenish color. From the discharge can be isolated the commoner organisms, such as the *Micrococcus catarrhalis, Streptococcus viridans, Streptococcus hemolyticus,* the pneumococcus, and even the *Bacillus influenzae.* When such a discharge does occur, its duration cannot be definitely foretold.

The treatment of "colds" depends on the stage of the infection at which the treatment is to be started. At the onset, when the mucosa is dry and free from secretions, a purge should be given. A hot bath may also be taken at this time. This should be followed by rest in bed. An ice bag to the head and a hot-water bag to the feet sometimes aid in giving relief, as do also a full hot tub bath and a large glass of hot lemonade before going to bed. For local relief of the nose condition, a spray of epinephrin 1:10,000 may be used.

When there is a profuse watery discharge, with or without a sore throat, atropin by mouth can be given until there occurs a dryness of the nose and throat. Hot alkaline nasal irrigations will be found useful. If the discharge is mucopurulent, hot alkaline nasal douches and the application of a 1 per cent. solution of cocain hydrochlorid to the nares may be tried. Sprays of liquid petrolatum are also soothing. The diet consists mainly of milk and eggs. An alcohol rub three times a day seems to have a beneficial action, and for further antiseptic action by way of the circulatory system, hexamethylenamin, 5 grains, internally, three times a day, may be prescribed.

An associated tonsillitis or pharyngitis of course requires appropriate treatment.

Vaccines in "colds" have not demonstrated their usefulness, probably because the vaccine has not been prepared from the true infecting organisms. Mixed vaccines have also been given from a prophylactic standpoint, and favorable results have been reported in those who have previously had frequent attacks of "colds." There is, however, no good proof that such preventive vaccinations are often of benefit. It is possible that a vaccine prepared from the organism described by Foster might be used to immunize an individual against future attacks of "colds."

New and Nonofficial Remedies

THE FOLLOWING ADDITIONAL ARTICLE HAS BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION. W. A. PUCKNER, SECRETARY.

CHLORAZENE (See THE JOURNAL, Sept. 30, 1916, page 1021).—The following dosage form has been accepted:

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SATURDAY, OCTOBER 21, 1916

RESISTANCE TO INFECTION

The accomplishment of an infection, Zinsser[1] writes, is not determined merely by the fact that a micro-organism of a pathogenic species finds lodgment in or on the body of a susceptible individual, but it is further necessary that the invading germ shall be capable of maintaining itself, multiplying and functionating within the new environment. An infection, then, or an infectious disease, is the product of the two factors, invading germ and invaded subject, each factor itself influenced by a number of secondary modifying circumstances, and both influenced materially by such fortuitous conditions as the number or dose of the infecting bacteria, their path of entrance into the body, and the environmental conditions under which the struggle is maintained.

This struggle between the host and the invading bacteria represents a situation in which no adaptation has taken place. The conflict may result in a local or systemic manifestation which constitutes disease. In the majority of cases it becomes "mild and locally limited if the protective powers far outweigh the invasive powers of the micro-organisms, violent if the balance is reversed." If it were possible to discover the various means by which the organism so often successfully exerts its powers of resistance and secures a recovery or immunity from disease, the prospect of therapeutic advance in the management of infections would doubtless be greatly enhanced. For this reason there seems at present to be in experimental medicine a growing tendency to study the precise fate of bacteria under conditions in which they experience varying degrees of resistance.

The recent studies of Bull[2] at the Rockefeller Institute for Medical Research, New York, are furnishing interesting facts in regard to the deportment of the micro-organisms in the circulation. It now appears quite probable that the power of the blood to cause agglutination determines, in large measure, whether after their direct introduction in an experimental way the bacteria are to be removed promptly from the circulation and septicemia avoided, or whether they are to remain there and produce a blood infection. An inverse ratio seems to exist between the power to produce septicemia and the degree of agglutination of the infection bacteria in the circulation of the host. Thus, according to Bull, virulent pneumococci, dysentery bacilli of the Shiga type, and virulent influenza bacilli do not agglutinate when injected into the circulation of normal rabbits; while typhoid bacilli, dysentery bacilli of the Flexner group, and nonvirulent influenza bacilli are agglutinated immediately after entering the circulation of these animals. On the other hand, an intravenous injection of a small quantity of specific immune serums causes an instantaneous agglutination of pneumococci and Shiga dysentery bacilli in the circulation of infected rabbits. The bacterial clumps accumulate in the organs in which they are phagocyted.

In this way it appears that active immunity generally insures the agglutination of specific bacteria when they are introduced into the circulation. The degree of agglutination and opsonization of bacteria, whereby they are readily mastered by the protective phagocytes available, within the body, is inversely parallel to the infectiousness of many bacteria for the host. Stryker[3] has recently ascertained that the growth of virulent pneumococci in homologous immune serum produces variations in agglutinability, decrease in virulence, inhibition of capsule formation, increase in phagocytability with normal serum, and change in absorption power and antigenic properties. Very few passages through the animal body suffice, however, to induce a reversion to the original type. Bull conservatively points out that the fact of the prominent rôle or even decisive part played by agglutinins and opsonins in the circulation of infected individuals need not imply that these are the only immunity forces at work or available.

THE FALLING DEATH RATE AND LENGTHENING OF LIFE

The baby of today has the prospect of a much longer average lifetime than did the baby of two generations ago. The average duration of life and the death rate are two complementary magnitudes.[4] If the death rate could be accurately established for any period, it would be an easy matter to calculate the span of life in a population in which the annual number of deaths equals the annual number of births, and without emigration or immigration. Such equalities exist in few countries, least of all in the United States. It was calculated by Willcox[5] some years ago that the

annual death rate in the United States was about 18 per thousand. On this basis the average length of life would be fifty-five years, obviously a rather high estimate for this country, involving errors of assumption which cannot readily be eliminated from the statistical calculations. For this reason it is ordinarily preferable to be satisfied with a statement of the "crude death rate," or the quotient of the number of deaths in the year divided by the population. Such figures are easier to obtain.

In order to ascertain whether modern progress in the knowledge of sanitation and of personal and public hygiene has been attended with improvement in the death rate, it is worth while to turn back to some historical data regarding mortality. The records of old cities show that a decided decrease in the death rate has steadily been going on. In Table 1 are some illustrative figures for mortality in London.[6]

TABLE 1.—MORTALITY IN LONDON

Year	Rate per Thousand
1660-1679	80
1680-1728	80
1729-1780	40
1905	15.1

The statistics in Table 2 for the white population of typical American cities were collected by the actuary of a large American life insurance company.

TABLE 2.—MORTALITY OF WHITE POPULATION OF AMERICAN CITIES

Years	Death Rate per Thousand
1804-1825	24.6
1826-1850	25.7
1851-1863	28.5
1864-1875	25.4
1876-1888	22.9
1889-1901	21.0

An estimate of the death rate in the United States last year, based on reports from states and cities containing 67,000,000 persons, or more than two thirds of the entire population, has been placed at 13.5 per thousand. The same source places the average rate at 16.2 during the period of five years which ended with 1905, and it has been falling ever since. Gains in cities are most noticeable.

There is, obviously, a limit to the increase in the length of human life, but there is reason to believe that the limit is still far off. In seeking for the explanation of success in the conservation results of the past few generations as a guide to the efforts of the future, a medical investigator quite naturally turns to the accomplishments and the possibilities which redound to the credit of our profession and the sciences on which its work rests. A layman may be inclined to conclude that the resources of hygiene have been unduly exploited. It is wholesome, therefore, to read the editorial opinion of a prominent American daily newspaper:

> The chief cause of the improvement has been progress in sanitation, in the use of those precautions and safeguards which are required for the prevention of diseases, especially those of an infectious character. We have profited by the results of scientific inquiry as to the origin and transmission of such ailments. Large and generous expenditures, with concerted effort, have cut down in a few years by more than one fifth the death rate for tuberculosis. Health officers have the support of the people. Pollution of water supplies at once excites public protest in these days, and there are few typhoid epidemics in comparison with the number twenty years ago. The press is always on guard. It will be admitted that its warnings and its constant dissemination of what may be called sanitary truths have been effective in promoting that death-rate reduction which official reports now disclose.[7]

An enthusiast in the conservation movement has stated fifteen years as a safe minimum estimate of prolongation of life still possible. This takes no account of future medical discoveries, and scarcely even reckons with the cumulative influence of present-day hygiene. Fisher[8] maintains that the addition of fifteen years is only a first step. He adds that if clean milk will prevent infantile diarrheal diseases, if clean water will prevent deaths from typhoid, and at the same time — according to Hazen's theorem — prevent two or three times as many other deaths, and if clean air will prevent tuberculosis, then it is evident that mere cleanliness in respect to these necessities will suffice to lengthen life by most if not all of the foregoing estimate. Fifteen years, says Fisher, is merely the "ore in sight." If we will work for it, we may get an even richer prize.

THE IMPROVEMENT OF STREAM-POLLUTION CONDITIONS

About half a century ago Lambert wrote: "It costs no more to 'raise' a man capable of living for 80 years than it does to 'grow' one who has not the capacity of living to be 40 years old."[9] In the midst of present-day enthusiasm for the conservation of life and other natural resources we have come to appreciate how much potential value of life is now allowed to be wasted which could be conserved. It is, however, one thing to recognize and admit the existence of a deplorable situation, and quite a different matter to find workable ways and means of combating it. An expert has calculated that the actual economic saving annually possible in this country by preventing needless deaths, needless illness (serious and minor), and needless fatigue, is certainly far greater than one and a half billions, and may be three or more times as great.[10] Generalizations of this sort, striking as they must be to any thoughtful individual, need to be supported by the evidence of actual conservation possibilities.

The greatest menace to most modern water supplies lies in their pollution with human excreta. The possibilities in this direction have become enormously

6. Farr: Vital Statistics, London, 1885, p. 131.

7. The Falling Death Rate, editorial, New York Times, Sept. 24, 1916.

8. Fisher, Irving: Report on National Vitality, Its Wastes and Conservation, Bull. Committee of One Hundred on National Health, 1909, No. 30, p. 110.

9. Lambert, T. S.: Sources of Longevity, New York, 1869, p. 6.

10. Fisher, I.: Bulletin of the Committee of One Hundred on National Health; being a Report on National Vitality, Its Wastes and Conservation, Washington, Government Printing Office, July 1909, No. 30, p. 120.

extended by the installation of sewerage systems for cities and some smaller groups of individuals. This procedure, which has been of incalculable benefit to the individual communities served, has in turn produced a new menace in an indirect way. Public opinion has in the last generation become more and more insistent on the provision of adequate sewerage with universal house connections; but it has not awakened or has actually shown indifference to the far reaching consequences of the sewerage methods in operation. Dr. Frost[11] of the U. S. Public Health Service has presented the situation in this way:

> Great as has been the effect of this improvement in the prevention of sewage-borne diseases, a just estimate of its influence is not to be based on this alone, but must take into account also the enormous social betterment resulting from the elimination of disgusting filth from the environment, the encouragement of more cleanly habits, and general elevation of ideals. Nevertheless, a direct consequence of this great sanitary achievement has been greatly to increase the pollution of watercourses; for the simplest and most obvious means of disposing of sewage is to discharge it directly into a convenient body of surface water, and this has been a common practice. Watercourses which previously were polluted with only such wastes as were thrown into them incidentally or washed in from the soil have now become much more grossly polluted by the discharge of fresh sewage from sewered communities.

The conservation of public health, in the broadest sense, demands that the public water supplies must be protected from such dangerous contamination. Efforts have not been directed to prevent all pollution since this result is at present practically impossible of accomplishment in many regions. Where danger exists it has been found more suitable to purify water at a moderate cost by application of modern, scientific methods, including storage, sedimentation, precipitation, filtration, and disinfection by the use of calcium hypochlorite, liquid chlorin and other disinfectants, making it possible, at a moderate cost, to procure satisfactory, clean, and safe water supplies from dirty and dangerously polluted sources. If this is not the ideal plan, it nevertheless represents an enormous temporary advance in the direction of safety.

A single illustration of some specific and tangible accomplishment in this direction almost invariably lends weight to efforts at remedial action or legislation. For this reason we refer in some detail to the results of a survey, by the Public Health Service and other authorities, of changes in relation to the public water supplies in the Ohio Basin, which is a fairly representative section of the United States. It embraces the water supplies of about 6,300,000 people, of whom fully two thirds are using water from surface sources. Approximately 3,500,000 are taking their water supplies from rivers, and 90 per cent. of these are supplied with water more or less effectively purified by sedimentation, filtration, disinfection, or combinations of these processes, only 10 per cent. using unpurified river waters. Practically all the water-purification plants represented have been installed within the last twenty-five years, the majority within the last ten years, during which period the largest three plants on the watershed, those of Cincinnati, Louisville and Pittsburgh, have been put into operation.

The effect of this plan of purification in the Ohio Basin on the conservation of life and health has been estimated by Frost[11] as follows: Eleven of these cities, with a total population of 243,000 in 1914, were still, in that year, taking their water supplies from the same source as in 1906, with no purification. The average typhoid death rate per hundred thousand in these cities was, in 1906, 76.8, and in 1914 approximately the same, 74.5. Sixteen other cities, including Pittsburgh, Cincinnati and Louisville, having in 1914 a population of 1,866,000, were in that year taking their water supplies from the same sources as in 1906, but with more or less effective purification. The average typhoid death rate in these cities in 1906 was 90.5 per hundred thousand, and in 1914, 15.3. Had these cities in 1914 suffered the same typhoid death rate as in 1906, they would have registered 1,688 deaths from this cause instead of the 286 deaths actually recorded. Thus in a single and not unusual year there was an indicated saving of 1,400 lives, due to the reduction in deaths from typhoid fever alone. There is good reason to believe that the saving in nonfatal cases of typhoid fever amounted probably to not less than from 14,000 to 15,000. Equally striking reductions in the prevalence of this disease have followed immediately on purification of the water supply in scores of other cities with such regularity as to justify the opinion that in the cities cited the reduction in typhoid fever from 1906 to 1914 must be attributed in large part to improvement in their water supplies.

Frost has pointed out that the pollution problem is increasing with the growth of communities in population, so that the purification plants and sewage disposal works are likely to become overtaxed and unable to meet the needs in individual cases. A slightly overburdened plant may be no less a menace than exists in the presence of gross pollution. As natural agencies are made to cooperate in the purification methods, their limitations must be ascertained and dealt with. It is useless to invest large sums in purification schemes or plan extensive works for the improvement of stream pollution without knowing what returns may be expected. The first requisite, in the control of stream pollution, therefore, is a closer and broader study of the conditions of pollution existing in the rivers of the country, of the fundamental factors that influence these conditions, and, above all, of their effects on health. Without such studies there can be no accurate knowledge as to the necessity for remedial measures, and no reliable estimate of the influence of proposed measures in protecting the public health.

11. Frost, W. H.: The Sewage Pollution of Streams, Its Relation to the Public Health, Public Health Reports, 1916, xxxi, 2486.

THE PROTEIN-SPARING ACTION OF CARBOHYDRATES

It is well known that the non-nitrogenous foodstuffs may spare body protein. The carbohydrates are unquestionably more efficient as protein sparers than are fats. The starvation output of nitrogenous waste products, or at least of urea, can be notably diminished by the ingestion of either of the non-nitrogenous nutrients mentioned, though the superiority of the carbohydrates in depressing the loss of nitrogen is always manifestly greater. If the carbohydrates are omitted from the diet or even replaced by fat, the effect on the nitrogen output is promptly seen.

Various theories have been proposed to explain this unique function of the carbohydrates in nutrition. One view has maintained that a certain concentration of blood sugar is always necessary for proper maintenance of physiologic activities. This sugar can be produced from proteins if carbohydrates are not available directly; and since, in the absence of carbohydrates, under physiologic conditions fats cannot well supply this want, proteins are broken down to yield the sugar which is lacking. The result is an increase in the nitrogen output in carbohydrate starvation.

Another view lately championed by Cathcart[1] of Glasgow and Janney[2] of New York postulates that carbohydrate is essential to protein synthesis. There is no doubt at present that sugar is not oxidized directly in the metabolism of the organism, but is rather dissociated in a definite way into simpler derivatives, of which methyl glyoxal, $CH_3.CO.CHO$, lactic acid, $CH_3.CHOH.COOH$, and pyruvic acid, $CH_3.CO.COOH$, are the most interesting possibilities. There is evidence that these compounds derived from sugars can in turn be converted into sugar in the diabetic individual. They can, accordingly, be concerned in the synthesis as well as the disintegration of the sugar molecule. But there is also some evidence now available, largely from perfusion experiments on surviving isolated organs, that both pyruvic and lactic acids can be converted into the amino acid alanin; that is, they can add nitrogen under conditions approximating physiologic possibilities.

Kocher[3] has recently reminded us that if this process of retaining nitrogen by dissociation products of sugar to form new amino acids, and hence proteins, occurs on a large scale in the body, it will explain why ingestion of carbohydrates spares body protein. To test this point he has undertaken a comparison of the sparing effects of ingesting lactic and pyruvic acids in contrast with equivalent amounts of undissociated carbohydrates, like sucrose, on the nitrogen output. The outcome of these experiments, conducted at the George W. Hooper Foundation for Medical Research of the University of California, indicates that lactic acid exerts practically the same sparing action on protein metabolism as do carbohyd[illegible]. The sparing action of pyruvic acid also is very distinct, but less marked than that following sugar. In view of what has already been mentioned regarding the possibility of adding on ammonia to the structures of the sugar derivatives to form alanin, it is readily conceivable that, when this process is operative, nitrogen arising from the catabolism of body proteins, instead of being promptly excreted, is utilized to synthesize new protein. This is not a new conception of metabolism; but Kocher's work gives added support to the possibility that the fixing of catabolized nitrogen by the dissociation products of glucose to form new proteins is the true mechanism of the sparing effect of feeding carbohydrates on the nitrogen output.

1. Cathcart, E. P.: The Physiology of Protein Metabolism, London, 1912, p. 121.
2. Janney, N. W.: Jour. Biol. Chem., 1916, xxiv, 30.
3. Kocher, R. A.: The Mechanism of the Sparing Action of Carbohydrates on Protein Metabolism, Jour. Biol. Chem., 1916, xxv, 571.

THE LYMPHATIC SYSTEM

A medical man is frequently brought into relation with situations which remind him of the existence and functional importance of that vague entity entitled the lymphatic system. During his student days its structure and physiologic duties were defined in rather indefinite terms; and the uncertainty as to precisely what the lymphatics consist of, where their ramifications proceed, and how they assist in the undoubtedly useful regulative performances which are ascribed to them seems to persist. It is a decided advantage, therefore, to have an opportunity to review the status of the subject and to have the timely problem of the lymphatic system presented in an expert way. This has recently been done by Dr. Florence R. Sabin.[1]

The conception of the structure and particularly the origin of the lymphatic system has undergone profound changes in recent years. How confused the ideas of the past generation have been is attested by the diversity of nomenclature; for all too often a new word is a convenient cloak for ignorance. Lymph radicles, lymph rootlets, lymph spaces, parenchymal spaces, tissue spaces — each term has had its vogue. In early times the lymphatics were thought to begin in wide mouths in the walls of the various cavities of the body; but the openings or stomata proved to be difficult to find and identify. The time-honored conception of the lymphatic system presented the idea of "hazy lymphatic capillaries that faded off indefinitely through hypothetical lymph radicles into the tissue spaces."

The more recent investigations, to which American students of anatomy have contributed in no small measure, serve to emphasize more clearly than ever before the independent identity of the tissue spaces in distinction from the lymphatic vessels. The old hypothe-

1. Sabin, Florence R.: The Method of Growth of the Lymphatic System, Science, Aug. 4, 1916, p. 145.

sis of an open system is giving way to the demonstration of distinct closed systems that contain fluid broadly termed lymph. We may now recognize blood capillaries, lymph capillaries and tissue spaces, each distinct and completely lined by endothelium, both blood and lymph capillaries being related to the tissue spaces in comparable ways. These regions are filled, specifically speaking, with plasma, lymph and tissue fluid, respectively. The newly dignified tissue spaces are discussed by Dr. Sabin as follows: It is well known that the plasma of the blood is constantly exuded from the blood vessels into the tissue spaces, so that all the cells of the supporting tissues, as well as the special cells of each organ, are bathed in fluid. Moreover, it is obvious that with all the varying activities of the cells of the body, the fluid becomes laden with different nutritive and with different stimulative substances and with different waste products, so that it varies widely in its composition. The subject of tissue spaces — meaning not empty spaces, but spaces which always contain fluid — is by no means a simple one. There are primarily the general, small spaces between all of the fibers and cells of the connective tissues and between the parenchyma of each organ and its supporting tissues; but there are also special systems of great spaces, which arise from the small spaces by a definite method, have a definite structure, and contain a fluid which is different from the other fluids in the body — such, for example, as the subarachnoid spaces, which surround the central nervous system. Other great systems of spaces are found in the internal ear and in the eye. The perivascular tissue spaces are likewise conceived to be independent of the lymphatics proper, although the chains of spaces along the pathways of certain blood vessels have often in the past been termed perivascular lymphatics because they were apparently arranged in sufficiently definite lines to resemble lymphatic channels.

The current views which have tended to take the lymphatic system itself "out of the realm of the mystical and to make it a definite anatomic entity" have received much, if not their main support through the study of development. The upshot of this has been to show that the problem of the origin of the lymphatic system is but a part, as Dr. Sabin has expressed it, of the general problem of the vascular system. Lymphatics are modified veins in the sense that they grow from the veins. The veins are the primary absorbents and continue to take part in absorption throughout life. At first they are the only absorbents; but presently the lymphatic vessels, budding out from the blood vascular system, partially invade the body; and present indications, we are told, point to the fact that their functions in absorption may be to some extent specific. In the living organism both true solutions and particles of matter pass into the lymphatic capillaries through the activities of endothelial cells or by means of wandering phagocytic cells. The investigations of the last fifteen years, says Professor Sabin, have demonstrated that the blood vessels are the primary absorbents, and that subsequently partial systems of absorbents develop, such as the arachnoid villi and the lymphatics that drain into the veins. The further elucidation of this topic will surely contribute to the solution of what has been called "the enigma of the mechanism of absorption." It will furnish an explanation of the difference between tissue spaces which are drained by lymphatics and others which are not. It will analyze the nature of the fluids which pass through lymphatics and those which do not.

Current Comment

EARLY MAN AND MEAT DIET

The advocates of the fleshless diet are accustomed to call on comparative anatomy to substantiate the claim that man is not well adapted for a meat-containing regimen. Milne-Edwards concluded that men, like monkeys, are organized for a diet essentially frugiverous; and the vegetarian propagandists delight in quoting the following statement of Cuvier:

> Man appears to be built to feed on fruits, roots and other succulent parts of vegetables. His short and not very strong jaws on the one hand, his canines equal to the other teeth and his tuberous molars on the other hand would not permit him to feed on grass or devour flesh.[1]

In contrast with such statements, Lyon[2] of the George Washington University has presented strong and somewhat unique zoologic evidence that man and his ancestors have long indulged in three forms of animal food which today are commonly found in markets. His argument is based on the recognized fact that three well known large tapeworm parasites of man exhibit a rather high degree of differentiation and a perfect adaptation to their definite and intermediate hosts. The definite host of the beef tapeworm, *Taenia saginata*, and of the pork tapeworm, *Taenia solium*, is man, and probably man alone. Lyon contends that both of these tapeworms are rather highly specialized and do not appear to be readily adaptable to other hosts. The conclusion seems clear that man has been eating cattle and pigs or their immediate ancestors, and perhaps himself, for as many ages as needed for these tapeworms to attain their present degree of differentiation. Lyon adds that we have no evidence that species of any kind are rapidly produced, and the parasites have probably had as slow an evolution as man himself. The fish tapeworm has other definite hosts than man, notably the dog, and the evidence is not conclusive that early man was piscivorous. The ease, however, with which man becomes infested with this parasite might indicate that he had eaten uncooked fish for a long period. As the trichina seems to thrive easily on almost any mam-

1. Buttner, J. L.: A Fleshless Diet, New York, F. A. Stokes Company, 1910, p. 5.
2. Lyon, M. W., Jr.: The Animal Diet of Early Man, Science, 1916, xliv, 427.

malian host, little importance can be attached to any apparent adaptability of the parasite *Trichina spiralis* for man and pigs, nor can this be taken as an indication of a pork diet for early man. Lyon has further ventured to suggest that it is not beyond possibility that the acquirement of a meat diet by the vegetarian pre-men may by improvement of nutrition, by shortening of digestive processes, and by stimulating properties of proteins and their split products have played an important part in man's evolution over his vegetarian competitors. Such speculations take us far into the realm of unproved fancies.

THE TREATMENT OF POLIOMYELITIS WITH IMMUNE HUMAN SERUM

In his report on the treatment of acute poliomyelitis with the serum of persons who have passed through an attack of the disease, Wells[1] emphasizes why it may be more advantageous to inject the serum intravenously (or intramuscularly) than intraspinally. While it is true that the nature and distribution of the lesions in poliomyelitis point to a hematogenous infection, and that for this reason the intravenous injection of immune serum, which it is supposed acts directly on the cause of the disease, appears to be indicated, it may be well to replace at the same time some of the cerebrospinal fluid with serum. In that way the essential localization of the disease would be attacked, so to speak, from all sides. Of course one great advantage of the intravenous route is that it permits the introduction of a practically unlimited amount of serum and thus a much greater quantity of the specific antibodies than possible by the intraspinal injection. As to the results of the injection of immune human serum, it can be said that those who have watched the effects closely appear to have been impressed with a prompt and rapid general improvement, especially in severe cases when treated early. At present, when this is the only form of anything like a specific treatment at hand, it should be used early and freely whenever possible.

THE ETIOLOGY OF EPIDEMIC POLIOMYELITIS

Undoubtedly the report by Mathers,[2] in which he briefly announced his isolation of a peculiar pleomorphic coccus from the brain and cord after death from poliomyelitis, a coccus that caused paralysis in rabbits and monkeys, was read with much skepticism by many who are familiar with the previous work on the etiology of poliomyelitis. Had it not been established beyond all doubt, they asked, that poliomyelitis is caused by a filterable virus, practically ultramicroscopic? And is it not a fact that, in all the recent investigations into the causation of this disease, no mention even is made of any organism which can be seen and grown so easily as the one described by Mathers? But totally unexpected though they may have been, Mathers' results did not have to wait long for confirmation by other and independent workers, as shown by the reports of the splendid work by Rosenow and his co-workers[3] and by that of Nuzum and Herzog[4] in this issue of THE JOURNAL. The fact that what seems like the same streptococcus-like micrococcus with the peculiar small and large forms has been isolated from the brain and cord in altogether about thirty cases of typical poliomyelitis in two widely separated cities by independent observers certainly must be accepted as sufficient evidence that the microorganism plays such part in at least the current epidemic of poliomyelitis as to demand the closest and most exhaustive study. Indeed, when we consider the reported results of the various inoculation experiments on animals with the cultures obtained from the brain and cord, as well as with those obtained by Rosenow and his associates from the throat and tonsils in a large number of cases of poliomyelitis, experiments with both unfiltered and filtered materials, there seems to be no escape from the general conclusion that the organism either is a secondary invader which in cultures may be more or less closely associated with the independent virus of poliomyelitis, or that it is itself the cause of poliomyelitis and capable of existing in filterable and nonfilterable forms. It would be interesting to discuss in detail the various facts and considerations which appear to favor the one and the other of these two possibilities, but it is doubtful whether such discussion would promote the final solution of the etiologic problem of poliomyelitis as now presented. We must await the results of further experiment and study.

ACTIVATED SLUDGE

The utilization of the nitrogen in sewage by the so-called activated sludge process is proving one of the most promising of recent methods of sewage treatment. As is well known, the disposition of sludge has long been a stumbling block in various processes of sewage disposal. This is chiefly because the expense of separating the solid matter of sewage from the water with which it is associated is so great as to overbalance any fertilizing value the sludge itself might possess. It is not found economical in most instances to dry or press the sludge and sell it for fertilizer, so that the removal of the sludge entails additional expense rather than revenue. Another reason for the failure to utilize sludge has been that when any separation of the solid matter is carried out, much of the organic matter of the sewage remains behind in the fluid portion. Simple sedimentation removes only about one third of the total organic matter in ordinary sewage, and chemical precipitation only about one half. It is considered an advantageous feature of the activated sludge process that the colloidal and suspended matters of the sewage are more highly concentrated in the sludge. According to recent experiments in Milwaukee,[5] about 70 per cent., or more than two thirds of the organic matter, is removed by the activated sludge method. The result appears to be that

1. Wells, C. W.: Immune Human Serum in the Treatment of Acute Poliomyelitis, this issue, p. 1211.
2. Mathers, George: Some Bacteriologic Observations on Epidemic Poliomyelitis, THE JOURNAL A. M. A., Sept. 30, 1916, p. 1019.
3. Rosenow, E. C.; Towne, E. B., and Wheeler, G. W.: The Etiology of Epidemic Poliomyelitis, this issue, p. 1202.
4. Nuzum, John W., and Herzog, Maximilian: Experimental Studies in the Etiology of Epidemic Poliomyelitis, this issue, p. 1205.
5. Copeland, W. R.: Engineering News, Oct. 5, 1916.

the fertilizing value of the sludge is raised by this process almost for the first time to the point of commercial importance. It seems likely from the Milwaukee experiments that under favorable conditions the nitrogen-rich activated sludge can be rid of its water and marketed at a profit. In the future, nitrogenous fertilizers are almost certain to be in even greater demand than at present. While there are many problems which still remain to be worked out with respect to the most suitable methods of drying or pressing, it is evident that sanitary engineers who have concerned themselves with this problem are much encouraged by the possibility for successful treatment offered by the activated sludge process.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST; SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION, PUBLIC HEALTH, ETC.)

DISTRICT OF COLUMBIA

Chamber of Commerce Protests Appointments of Nonresidents.—Announcement having been made that in filling existing vacancies in the positions of chief food inspector and chief medical and sanitary inspector of public schools, appointments would be made without reference to residence in the District of Columbia, the Washington Chamber of Commerce adopted a resolution that said positions should be filled from among the many duly qualified physicians who are bona fide residents of the District.

Medical Inspector Dies of Infantile Paralysis.—Dr. Arthur Le Roy Hunt, a medical inspector in the service of the health department, died, October 7, of infantile paralysis believed to have been contracted in the line of duty. While Dr. Hunt had not been exposed to any known case of infantile paralysis since the middle of July, yet his daily duties had brought him into contact with many children who had come into the District of Columbia from infected areas, with certificates from the local authorities purporting to show absence of exposure to infection. Dr. Hunt was one of the best known anesthetists in Washington.

GEORGIA

Hospital Items.—Dr. Jefferson D. Chason, Bainbridge, has awarded the contract for the erection of a hospital on Shotwell Street, to cost $45,000. The hospital will have thirty rooms for patients in addition to the operating rooms, public wards and nurses' quarters.——The annex to the Columbus City Hospital was opened for the inspection of the public, August 17. The dedicatory speech was made by Rev. J. W. Howard. The new building is three stories in height, and will be used for a contagious disease ward and for negro patients.——A building permit has been issued for the new Macon City Hospital which is to cost $80,000, and work on the foundation has already been commenced. The three hospital buildings are to be completed within eight months. The main building will be a five-story structure with balconies on each floor and a roof ward. There will also be a service building, a three-story structure with a free clinic or outpatient department, and dispensary for both white and colored patients. The upper two floors will contain wards for negroes. It is expected that the cornerstone will be laid the latter part of this month.——LaGrange will soon have a city hospital. Mr. J. E. Dunson, president of the LaGrange Banking & Trust Co., willed the city $10,000, and $500 a year for five years for its support, provided the city would give a like amount.——The LaGrange Sanatorium, valued at $30,000, has been bought, the city giving $10,000 and Dr. and Mrs. Henry R. Slack, LaGrange, the remaining $10,000 to complete the purchase. Possession will be given to the city, Jan. 1, 1917. The hospital will have forty beds and a negro ward.

IDAHO

New Officers.—At the annual meeting of the Idaho State Medical Association, held at Twin Falls, October 5 and 6, the following officers were elected: president, Dr. Charles S. Moody, Hope; vice president, Dr. Albert F. McClusky, Buhl; secretary, Dr. Edward E. Maxy, Boise (holdover); delegate to the American Medical Association, Dr. Charles R. Scott, Twin Falls; alternate, Dr. Leonard E. Hanson, Wallace. Sand Point was fixed on as the place of meeting for 1917, and the meeting will be held in the latter part of June or early in July, the exact date not yet being fixed.

ILLINOIS

New Sanatorium Opened.—The Municipal Tuberculosis Sanatorium at Rock Island was opened, October 19, and a reception was given in the afternoon and evening.

Diphtheria in State School and Colony.—The State School and Colony of Lincoln reports nine new cases of diphtheria, October 11, making a total of nineteen. One death has thus far been reported.

Southern Illinois Medical Association.—The forty-second annual meeting of the Southern Illinois Medical Association will be held at Benton, November 2 and 3, under the presidency of Andrew J. Butner, Harrisburg.

Hospital Auxiliary Formed.—The Mary Thompson Hospital Auxiliary has been formed with Mrs. George Patrick, Wheaton, president, and Dr. Goldye Hoffman as a vice president. The association hopes to do much to perpetuate the work of the founder of the hospital, the late Dr. Mary Thompson.

Personal.—Dr. James W. Pettit was elected president of the Mississippi Valley Sanatorium Association, at the meeting of the Mississippi Valley Conference on Tuberculosis, October 7.——Dr. Charles H. Starkel, Belleville, chief surgeon of the Southern Railway Company, entertained the members of the staff of the railway at a dinner at the St. Clair Country Club, October 3.

Chicago

New Dean for Northwestern.—The resignation of Dr. Arthur R. Edwards, as dean of Northwestern University Medical School, was accepted by the trustees of Northwestern University, October 17. Arthur I. Kendall, professor of bacteriology, was made acting dean.

Personal.—Dr. Julius H. Hess has been appointed professor of pediatrics and head of the division of pediatrics in the University of Illinois, College of Medicine.——Dr. Gilbert M. Loewe, who has been working under the German Red Cross at Naumburg, Germany, for eight months past, has returned home.——Dr. Franklin H. Martin has been appointed a member of the advisory commission to be associated with the council of national defense.

MARYLAND

Personal.—Dr. J. Hubert Wade has been appointed chairman of the Penal Board of Control.——Dr. William H. Welch has returned from Europe.——Dr. John H. Von Dreele, health warden of the thirteenth ward of Baltimore, has resigned.——Dr. James J. Mills, Baltimore, has returned from France.——Dr. Grover A. C. Stem, Baltimore, who is on duty with the German army on the Eastern front, has been given the iron cross by the emperor.

Increase in Infantile Paralysis.—The total number of cases of poliomyelitis for the week exceeded forty-five, the highest number on record since the beginning of the outbreak. With the development of this number of new positive cases, the health department has more patients than it can care for, the Children's Hospital School, Sydenham Hospital, and the Harriet Lane Home being crowded. Arrangements have been made with the Kernan Hospital for ten additional beds and for as many at the Garrett Hospital as can be obtained. At present there are sixty-one cases at the Children's Hospital School. There is a slight epidemic of the disease in Garrett County, several new cases having been reported to the state department of health during the week. The situation in the counties was discussed at a recent general meeting of the state board of health, and Dr. John S. Fulton, the secretary of the board, was authorized to lift the quarantine whenever he felt conditions would justify it. Children from other states are still barred from Maryland and in several instances have been turned back. It is at present hoped that the schools will be open to the kindergarten and first six grades by November 10.

NEW YORK

Italian Liner Quarantined.—The Italian liner *Duca d'Aosta* which arrived from Naples, October 14, with 1,372 steerage passengers, has been held in quarantine for twenty-four hours on account of the illness of an immigrant who presented symptoms suggestive of Asiatic cholera.

Lessons in Hygiene.—The New York County Chapter of the American Red Cross has opened a teaching center at 3 East Fifty-Sixth Street where classes in elementary hygiene and care of the sick, first aid to the injured, home dietetics and the making of surgical dressings are held daily.

New York City

Poliomyelitis.—October 14, there were fifteen new cases of poliomyelitis reported in Greater New York, with four deaths. The number of cases to that date has been 9,202, with 2,356 deaths, and there were 1,136 patients in hospital on October 14.——On the recommendation of Senior Surgeon Charles E. Banks, U. S. P. H. S., in charge of inspection in New York, Surgeon-General Blue has ordered the federal inspection of travelers from New York to be discontinued.

Police Laboratories Again Opened.—Funds have been contributed which make possible the opening of the Psychopathic Laboratory at police headquarters. This laboratory was opened last December in order to cull from the prisoners each day those who were mentally defective and to send them to suitable institutions. The list of those subscribing to the support of this laboratory include Andrew Carnegie, F. W. Vanderbilt, Daniel Guggenheim, Mortimer L. Schiff, William Rockefeller and Mrs. George B. Alexander.

Fireproof Garb for Children.—Dr. Charles F. Pabst, Coroner's Physician of Brooklyn, declares that the statistics of the New York fire department show that 90 per cent. of accidental and preventable fires during the past year were caused by children swinging cans filled with dried leaves and paper, and warns parents against allowing children to play with these portable fires. He recommends that all children's clothing should be fireproofed and says this may be done by soaking any fabric for five minutes in a solution of ammonium phosphate, in the proportion of 1 pound to 2 quarts of water. This will render any material fireproof until it is washed.

Lectures.—The Wesley M. Carpenter lecture, which was to have been delivered by the late Dr. John B. Murphy, Chicago, was delivered by his collaborator, Dr. Philip H. Kreuscher, who presented the joint work of Dr. Murphy and himself on "A Clinical and Experimental Study of the Metastatic Arthritides," based on 800 clinical cases and illustrated with lantern slides, at the New York Academy of Medicine, October 19. Dr. George E. Brewer also gave a brief appreciation of Dr. Murphy and his place in American surgery. ——The governors of the New York Skin and Cancer Hospital announce that the eighteenth series of clinical lectures on diseases of the skin will be delivered by Dr. L. Duncan Bulkley in the outpatient hall of the hospital on Wednesday afternoon at 4:15, beginning November 1.

PENNSYLVANIA

Typhoid at Capital.—Eight new cases of typhoid fever were reported in Harrisburg, October 12, making a total of 122 since October 1. The city health officials today canceled the license of the Hershey Creamery Company, forbidding the sale of its products here. The source of the epidemic has been traced to the company's plant and products.

Paralysis Bar Up Again.—Public schools, Sunday schools and moving picture places have been closed in Norwood, Delaware County, following the discovery of a case of infantile paralysis in that town.——The schools of Collingswood, N. J., which have just been opened have been ordered closed again, following the development of two cases there.——Three new cases were reported in Philadelphia, October 12. Four new cases were reported in districts outside of Philadelphia, October 12, making a total of 1,722 since July 1. The list includes 905 in Philadelphia.

Philadelphia

Rush Society Lecture.—John Scott Haldane, M.D., LL.D., F.R.S., Fellow of New College, Oxford, gave the first lecture in the Rush Society series for the present year in Thomson Hall, College of Physicians, October 19. The subject was the "New Physiology." Professor Haldane is in this country at the invitation of Yale University to deliver the Silliman Lectures.

Personal.—Although Daniel Baugh resigned from the board of trustees of Jefferson Medical College and Hospital last summer, the board thus far has not accepted his resignation. His reason for resigning is his advanced age—he is now 80—and his desire to lessen his duties. He has been a munificent benefactor to Jefferson and by his active participation in its management has been of great service to that institution. In July, this year, he gave $100,000 for the endowment fund of the college.——Dr. Frank C. Abbott, who has been serving in the Military Hospital in Vendome, France, has returned home.——Two Philadelphia physicians, Lieuts. Joseph V. Klauder and John B. Ludy, M. R. C., U. S. Army, have been placed on the active list and assigned to duty in the Hawaiian Department.——Dr. R. Tait McKenzie, physical director of the University of Pennsylvania, who has been in England for the past year serving as a major in the Medical Corps of the British army, has arrived in Philadelphia to resume his usual duties at the university.——Dr. Ardrey W. Downs, formerly professor of physiology at the Medico-Chirurgical College, has accepted a position as head of the department of physiology at McGill University, Montreal.

WISCONSIN

Poliomyelitis in Wisconsin.—According to the records of the state board of health, 318 cases of infantile paralysis had been reported in Wisconsin up to September 30.

Work of Rhinelander Laboratory.—The new Rhinelander branch of the state department of hygiene is manufacturing antityphoid vaccine which it is sending to any physicians in its territory on request. The laboratory is also prepared to make analyses of sputum, the Widal test, water analysis and the like.

University Dispensary Clinical School Opens.—The dispensary clinical school of the Marquette University Medical Department reopened at Reservoir Avenue and Fourth Street, Milwaukee, September 25. A new feature will be a charge of 10 cents a visit for those who can pay it. The dispensary will be open from 10:45 a. m. to 2 p. m. daily.

Wisconsin Medical Women's Meeting.—At the seventh annual meeting of the Wisconsin Medical Women's Society, held in Milwaukee, October 3 to 4, the following officers were elected: president, Dr. Minnie M. C. Hopkins, Oconto; vice president, Dr. Irene G. Tomkiewicz, Milwaukee; secretary, Dr. Mary L. Ewing, Evansville, and treasurer, Dr. Belle Mair, Oshkosh.

New State Society Officers.—At the seventieth annual meeting of the State Medical Society of Wisconsin, held in Madison, October 4 to 6, the following officers were elected: president, Dr. Hoyt E. Dearholt, Milwaukee; vice presidents, Drs. John F. Pember, Janesville, and Joseph F. Smith, Wausau; secretary, Dr. L. Rock Sleyster, Waupun, and treasurer, Dr. Sidney S. Hall, Ripon; delegates to the American Medical Association, Dr. Horace M. Brown, Milwaukee, and the secretary.

Health Movies.—The Wisconsin Anti-Tuberculosis Association has started a crusade throughout the rural districts of the state. It has sent out a health wagon which carries sound health information, moving pictures and a health exhibit. The wagon is in charge of Ted Worle, the originator of the flying squad of health of the association. The beginning was made in Walworth County in August. Rock County was the next to be invaded, and the work will be continued as late into the fall as the weather conditions will permit. The days are spent in traveling and visiting farm houses and distributing literature, and in the evenings moving picture shows and lectures are given in the nearest villages or towns.

GENERAL

Southern Medical Association.—The annual meeting of the Southern Medical Association will be held in Atlanta, November 11 to 16, under the presidency of Dr. Robert Wilson, Jr., Charleston, S. C.

Erie Surgeons Elect.—At the twenty-sixth annual meeting of the Erie Railway Surgeons Association, held in New York, Dr. Chalmers D. Morgan, Galion, Ohio, was elected president; Dr. Rufus B. Harden, Waverly, N. Y., vice president; and Dr. Bertis R. Wakeman, Hornell, N. Y., secretary and treasurer. The next meeting will be held in Cleveland.

National Medical Examination Day.—Following a custom inaugurated last year the National Association for the Study and Prevention of Tuberculosis has set apart the week of December 3 to 10 as National Tuberculosis Week, and has

fixed December 6 as National Medical Examination Day when physicians all over the United States will be requested to examine patients for tuberculosis free of charge.

American College of Surgeons Meeting.—The fifth meeting of the American College of Surgeons will be held in Philadelphia, Oct. 27, 1916. One of the chief questions of interest to come up at this meeting will be the acceptance of a gift of from $300,000 to $500,000 from the John B. Murphy Memorial Association of Chicago to build in Chicago the John B. Murphy Memorial Hall of the American College of Surgeons.

Accuracy of Certified Causes of Death.—At the next meeting of the American Public Health Association, to be held in Cincinnati, October 24, the accuracy of certified causes of death will be one of the important subjects considered. To the meeting will be submitted the report of a special committee, of which Dr. Haven Emerson is chairman, appointed to consider the causes in question and their relation to mortality statistics and the "International List of Causes of Death."

Impostor.—D. Appleton & Co., New York, announce that a man using the name B. F. Little has recently been collecting money from physicians in Oregon and Washington as their representative. This man states that he is collecting for the Western Students Benefit Association of Denver. Physicians in Puyallup, Wash., and Coquille, Ore., have been victimized. Any payments made to this man, who has no connection whatever with their firm, are made at the risk of the physician making the payment.

New Mississippi Valley Officers.—At the annual meeting of the Mississippi Valley Medical Association, held at the Hotel Claypool, Indianapolis, October 10 to 12, Toledo, Ohio, was decided on as the place of meeting for 1917, and the following officers were elected: president, Dr. Channing W. Barrett, Chicago; vice presidents, Drs. Francis M. Pottenger, Monrovia, Calif., and Frank B. Wynn, Indianapolis; secretary, Dr. Henry Enos Tuley, Louisville, Ky. (reelected), and treasurer, Dr. S. C. Stanton, Chicago (reelected).

Southwestern Physicians Hold Meeting.—The eleventh annual meeting of the Medical Association of the Southwest was held in Fort Smith, Ark., October 2 to 4. Kansas City was selected as the next place of meeting and the following officers were elected: president, Dr. Everett S. Lain, Oklahoma City; vice presidents, Drs. Howard L. Snyder, Winfield, Kan.; John H. Thompson, Kansas City, Mo.; Matthew M. Smith, Dallas, Texas, and Charles S. Holt, Fort Smith, Ark., and secretary-treasurer, Dr. Fred H. Clark, El Reno, Okla.

Personal.—Dr. Joseph A. Blake has recovered from his recent illness and has returned to work in his hospital.——Dr. Louis L. Seaman arrived in New York on the Anchor liner *Cameronia*, October 9.——Dr. Paul J. Werner sailed for Europe, September 22, and will do war relief work in Heidelberg.——Dr. J. Richard Kevin, major surgeon of the Twenty-Third Infantry, has returned from the border.——Dr. Francis LeRoy Satterlee, Jr., underwent an operation, October 10, for cancer contracted as a result of Roentgen-ray burns several years ago. Dr. Satterlee has been operated on twice and lost two phalanges of the second finger of the right hand.

Poliomyelitis in Neighboring States.—Up to the last available date of record there have been in New York and the adjacent states of New York, Connecticut, Massachusetts, New Jersey and Pennsylvania the following number of cases and deaths:

	Cases	Deaths
New York City (Sept. 30)	9,029	2,286
New York State, exclusive of New York City (Sept. 14)	2,785	318
Connecticut (Sept. 18)	677	Not reported
Massachusetts (Sept. 19)	678	95
New Jersey (Sept. 19)	3,495	775
Pennsylvania (Sept. 20)	1,278	313

Alvarenga Prize.—The College of Physicians of Philadelphia announces that the next award of the Alvarenga Prize, amounting to $250, will be made on July 14, 1917, provided that an essay deemed worthy of the prize shall be offered. The essays must be on the subject of medicine, and cannot have been published. They must be typewritten, and if written in a language other than English should be accompanied by an English translation, and must be received by the secretary of the college on or before May 1, 1917. Each essay must be sent without signature, but must be plainly marked with a motto and be accompanied by a sealed envelope having on its outside the motto of the paper and within the name and address of the author. The successful essay or a copy thereof shall remain in possession of the college; other essays will be returned on application within three months after the award. The essays should be sent to Dr. Francis R. Packard, secretary of the College of Physicians of Philadelphia, 19 South Twenty-Second Street, Philadelphia. The Alvarenga prize was not awarded in 1916.

Definition of Major Surgical Operation.—Dr. Francis D. Patterson, chief of the Division of Industrial Hygiene and Engineering of the Department of Labor and Industry of Pennsylvania, forwards the following definition of the term "major surgical operation," as defined and issued by the Workmen's Compensation Board of that state, in interpreting the term as applied to cases under the compensation law of Pennsylvania:

A major operation is a surgical procedure which entails immediate serious consequences to the patient and which requires skill and training to perform and includes: 1. The setting of fractures of long bones and reducing of subluxations, providing accuracy and efficiency of reduction be demonstrated by x-ray taken before and after surgical treatment. 2. All operative procedures, other than finger and toe amputations, cleansing, draining and closing wounds, evacuating pus by incisions, the manipulating and reduction of uncomplicated dislocations, the treatment of uncomplicated fractured ribs, the removal of superficial foreign bodies from the eyes, and the removal of subcutaneous foreign bodies.

NOTE.—All fees for a major operation shall be limited to such charges as are reasonable for similar treatment of injured persons of like standard of living in the same community, and where such treatment is paid for by the injured person himself, the charges including hospital service to be paid by the employer not in any case to exceed the sum of $75.

Bequests and Donations.—The following bequests and donations have recently been announced:

Beth Israel Hospital, New York, $10,000, by the will of Harris Wolff.

Fresh Air Fund and Home for Crippled Children of St. Thomas Protestant Church, New York, and the Brooklyn Home for Consumptives, each $5,000, by the will of Mrs. Mary Stewart Bierstadt.

Mount Sinai Hospital, New York, and the United Hebrew Charities, each $1,000, by the will of Dr. Jacob H. Frankenberg.

White Plains Hospital, New York, $2,500; New York Society for Prevention of Cruelty to Children, and New York Society for Suppression of Vice, each $5,000.

Norwegian Lutheran Deaconess Home and Hospital, Chicago, $10,000, subscription by the staff of the hospital; $25,000 for the endowment of a ward, by J. P. Hovland; a donation of $9,100, by Mrs. Elvira Lindeman, and up to October 15, subscriptions of $26,450, and a fund of $1,000 by James A. Patten.

Minnesota State Anti-Tuberculosis Fund, $12,935.40, from the State Athletic Commission, being 10 per cent. of the receipts of legally authorized boxing matches in the state.

To founding a chair of bacteriology in Jefferson Medical College, one half of the trust fund remaining from the estate of Dr. James Y. Shearer, Sinking Springs, Pa.

Boston Dispensary and Massachusetts General Hospital, each $3,000, by the will of Henry F. Lynde, Somerville.

For erection of a home for nurses of La Crosse (Wis.) Hospital, two pieces of property and a donation of the necessary funds by Mrs. Henry Gund.

Peoria (Ill.) Public Health Nursing Association, $3,300, as a result of tag day.

FOREIGN

Hospital Improvements.—Government decrees in the Argentine have authorized the installation of water and sewerage services at a cost of $58,000 at the Hospital Comun Regional del Centro Bell-Ville, Cordoba; the construction of a building to be used for an electric plant at a cost of $15,000, and the installation of an electric plant and electric lighting at a cost of $48,900 for the Comision Asesora de Asilos y Hospitales Regionales, Buenos Aires, and the installation of water and sewerage works at the Sanatorio Nacional de Tuberculosos, Sante Maria, Cordoba, at an estimated cost of $62,700.

Health for Siam.—Mahildo, Prince of Songkla, brother of the King of Siam, has come to America to take a course of instruction in public health at Harvard Medical School and the Massachusetts Institute of Technology, with the idea of a new régime in Siam in which the public health will be a serious concern of the government. The care of the body will be taught in the schools; sanitary living will be made compulsory; preventable diseases will be prevented, and by state control of marriage, the union of those not physically fit will be made impossible. Prince Mahildo will maintain his headquarters in Gloucester.

Restriction of Sale of Drugs in Spain to Pharmacies.—According to the Madrid *Siglo Medico*, the sale of *medicamentos* is definitely and permanently forbidden outside of pharmacies and in these they are to be sold only on a *prescripcion facultativa*. Pharmacists and their employees have their attention called in particular to ether, cocain and morphin which must not be dispensed without a corresponding prescription for them which insures their proper use. Infringements of this regulation will be punished and those knowing of such infringements are urged to inform the state board of health (*Inspeccion provincial de Sanidad*).

German Journal Arrives.—The *Therapeutische Monatshefte* for September arrived, October 8, the first German medical journal to reach THE JOURNAL since early last May. It is the second issue of the *Monatshefte* to be received this year, No. 2 having been reviewed in THE JOURNAL, April 15, p. 1280. Before the war twenty-six German journals were indexed regularly. The German medical journals are being published regularly, as abstracts from them appear in the Scandinavian and Netherlands exchanges. An Amsterdam exchange lists the contents of several of the German weeklies regularly. Military surgery and hygiene crowd nearly everything else out, but both are conspicuous by their absence in the articles in the lone *Therapeutische Monatshefte* just received.

Enforcement of Antimosquito Measures in Paris.—The French Académie de médecine recently voted a resolution to the effect that the public health service should have added to the regulations in vogue against epidemics the right to enter private property and apply the measures necessary to eradicate mosquitoes. Such regulations are in force in the French colonies and are rigidly applied, but the population has no redress for the nuisance and danger of mosquitoes in France proper. The war has brought many carriers of the malaria parasite to France, and a number of small foci of true malaria have developed from them in regions where the anopheles abound. Certain large private grounds in Paris have been a hotbed for mosquitoes this year but the police were powerless to interfere. During the discussion it was stated that a house or factory left vacant for a month or so is liable to afford breeding places for mosquitoes in the water-closet tanks and traps.

Drugs in Italy.—An important medical organization in Italy, the Consiglio della Federazione degli Ordini dei Medici, recently adopted by unanimous vote a resolution calling on the government to aid the state and private laboratories and central military pharmacy in the production and sale of drugs, and to study ways and means to foster the best conditions in these lines. The second half of the resolution urges physicians in their prescriptions to restrict themselves to drugs of well-recognized and practical efficiency and prescribe as little as possible of pharmaceutic specialties and specialized products. The resolution concludes with the words, "and deploring once more that certain physicians lend themselves to the study and boosting of pharmaceutical specialties of certain houses, we call attention to the numerous resolutions adopted by the organization from time to time condemning any and every form of suspicious relations between physicians and pharmacists."

Deaths in the Profession Abroad.—Dr. William Appleton Meredith, M.B., C.M. (Edin.), 1872, F.R.C.S. (Eng.), 1897; aged 68; a native of Philadelphia, but for many years a resident of London; well known as an abdominal surgeon, and consulting surgeon to the Samaritan Free Hospital; author of many monographs dealing with his specialty; died in London, recently.——P. Lagleyze, aged 61, professor of ophthalmology in the University of Buenos Aires, and permanent member of the executive committee of the Pan-American medical congresses, a frequent speaker at international medical and ophthalmologic congresses, collaborator on various specialist and general medical journals and dean of the university. He also took a leading part in fostering art and was a member of the National Art Commission. He had published about 200 articles on the eye and devised a special technic for operations on cataract, squint and ectropion.——A. Quiroga, professor of chemistry at the same university, aged 65, and G. Anschutz, professor of bacteriology, aged 37.

CANADA

University News.—Attendance and registration in the new postgraduate course in the University of Toronto in medicine is above the average this year. It is expected that several students will yet enroll in the coming two weeks.

Total Canadian Losses in War.—Up to October 11, the total number of casualties among officers and men of the Canadian expeditionary forces has been 52,025, divided as follows: killed in action, 8,134; died of wounds, 3,120; died of sickness, 452; presumed dead, 1,009; missing, 1,372, and wounded, 37,939. The marked feature of this report is the very small number dying of sickness.

Canadian Committee on Orthopedics.—The Military Hospitals Commission has appointed the following committee on orthopedics to consider the matter of artificial limbs for soldiers: Drs. Clarence L. Starr, Toronto; William E. Gallie, Toronto, and Lieut.-Col. A. Mackenzie Forbes, Montreal. Dr. Francis J. Shepherd, Montreal, and Dr. Frederick E. Thompson, the medical superintendent of the commission, will be ex-officio members of the committee.

Personal.—Dr. William A. C. Macdonald, Windsor, has been commissioned in the medical department of the Canadian army, and will soon leave for France to assist in the eye and ear work in a Canadian base hospital.——Maj. Alex. B. Osborne, Hamilton, Ont., has been promoted to lieutenant-colonel.——Hon. Dr. Robert A. Pyne, minister of education for Ontario, has returned from England.——Surg.-Gen. Carleton Jones, director-general of the Canadian Army Medical Services, is returning to Ottawa, but this does not mean that General Jones is to leave the service.

Hospital News.—The proposed reorganization of the Canadian Army Medical Services in England and France and the segregation of Canadian soldiers in Canadian hospitals abroad is not to be accomplished without many vigorous protests. The plan was very carefully considered by a committee of Canadian officers abroad, consisting of Col. Herbert A. Bruce, Toronto; Col. Charles Hunter, Winnipeg; Lieut.-Col. Walter McKeown, Toronto; Lieut.-Col. Frank W. E. Wilson, Niagara Falls, Ont., and Lieut.-Col. Wallace A. Scott, Toronto. This committee considers that the work of caring for the wounded will be greatly facilitated thereby, but the segregation is not to take place until the convalescent stage has been reached. It is understood that the plan will result in saving many millions of dollars. It is also claimed for the scheme that instead of 15 per cent. returning to active service, fully 65 per cent. will be available.——Queen's University Base Hospital in France is to move from Tréport to Etaples as soon as the weather becomes too cold to stay in tents. The hospital has treated over 4,000 patients in France.——Lieut.-Col. John Stewart, Halifax, N. S., has been offered the position of head of the Duchess of Connaught Canadian Hospital at Cliveden, England, but has not yet accepted. Dr. Charles W. F. Gorrell, Ottawa, who was in charge of this hospital, has resigned, and is returning to Ottawa.——The Military Hospital at Coburg, Ont., has now in residence eighty returned soldiers.——The new private pavilion of the Royal Victoria Hospital, Montreal, donated by Mr. J. K. L. Ross, one of the directors of that institution, was formally opened by the Duke of Connaught during the past week. This will make available about 200 additional beds in the Victoria Hospital proper for public ward patients.——Reforms are to be instituted in the Toronto Base Military Hospital as the result of a recent official inquiry. The inquiry elicited the fact that the medical staff under the command of Lieut.-Col. Thomas B. Richardson has taken splendid care of their patients in this hospital. Over 9,000 patients have been treated, and the death rate has been less than one half of 1 per cent. A complete quartermaster's staff will be appointed for base hospitals in the future.

WAR NOTES

New Collapsible Stretcher.—The Red Cross reports the use of a new collapsible stretcher which can be folded so compactly that it can be lowered into a trench and a wounded soldier placed in it, thus obviating the necessity previously existing of lifting the wounded men out of trenches, exposed to fire, and then placing them on the ambulance stretchers.

Ambulance for Balkans.—The recently formed section of the American Ambulance Field Service, which is to serve with the French army in the Balkans, left Paris, October 13, for the Saloniki front. The section includes thirty ambulances with the necessary repair cars and kitchen car and the other accessories for service, and is under the command of Lovering Hill of New York.

OUR TROOPS ON THE BORDER

Health Report.—The weekly health report from the Southern department for the week ending September 30 shows the percentage of illness among the militia to have been 2.25 per cent., with seven deaths. For the same period the percentage of illness among the regulars was 3.42 per cent., with five deaths.

National Guard Officers Resign.—The resignations of the following officers of the Medical Corps of the Organized Militia have been accepted by the president, taking effect on the dates given below: Lieut. Harry C. Guess, Buffalo; Lieut. Philip H. Stephens, Los Angeles, September 15; Capt. Dean F. Winn, Atlanta, Ga., September 29; Maj. Frank W. Foxworthy, Indianapolis, September 16; Maj. George H.

Parmerlee, Detroit, August 31; Lieut. William C. Bell, Dearborn, Mich., September 1; Capt. Arnt G. Andersen, Minneapolis, September 25; Capt. William O'G. Quinby, Newark, N. J., September 1; Lieut. Sherwood V. Whitbect, Hudson, N. Y., September 30; Lieut. George B. Booth, Toledo, Ohio, September 1; Lieut. Lemuel R. Brigman, Cleveland, September 1; Maj. Thomas G. Aller and Lieut. James B. Rucker, Jr., both of Philadelphia, August 30, and Maj. Scurry H. Terrell, Dallas, Texas, September 15. Maj. W. H. Tukey, Boise, chief surgeon of the Idaho National Guard, resigned, September 15, to accept a new position in Idaho.

PARIS LETTER

PARIS, Sept. 21, 1916.

The War

TREATMENT OF WOUNDS OF THE VESSELS

At the "Réunion médicale de la IV-e armée," Dr. E. Potherat, surgeon of the Paris hospitals, drew attention to cases of wounds of the greater vessels (of the neck and limbs), in which the hemorrhage is absent or very slight, and which are compatible with life; these lesions sometimes cause so few signs that they may be altogether passed over until it happens that the obstacle to hemorrhage is removed, and bleeding is suddenly produced in abundance and with the gravity ordinarily associated with the wound of a great vessel. The obstacle to considerable primary hemorrhage which tends to mask the lesion is usually a small hemorrhage closely confined by the muscles and aponeuroses; this hematoma acts as a plug. Sometimes the vascular coats are themselves the seat of this plug while at other times it is formed by the projectile. The removal of a foreign body or the breaking down of clots by suppuration, and the freeing of the vasculonervous bundles by the removal of the hematoma or of the cellular tissue are the usual causes which provoke secondary hemorrhage with its consequences.

This train of events is quite common in war wounds and in all parts of the body, and, because of the danger to life which it constitutes, it is necessary to bear it in mind. Fatal hemorrhage may occur after a few hours, a few days or even, sometimes, a few weeks. Whenever, therefore, a projectile has penetrated the body in such a place or in such a direction that it must have passed through a vasculonervous bundle or in the immediate neighborhood of large vascular trunks even though the hemorrhage is moderate or nonexistent, even though no sign betrays the vascular lesion, it is necessary to follow the same line of conduct as if such a lesion were certain. The wound must, therefore, be opened up, and the vessel exposed and carefully examined to make certain of its integrity if it is intact, to discover the lesion if it exists, and to tie the vessel. By opening up the wound and removing the clots and injured parts which are sure to necrose, this intervention, even though it may prove that the vessels are intact, produces conditions favorable for repair, and if there is a vascular lesion, it safeguards the life of the patient.

Drs. Barbarin and Lerat communicated to the "Réunion médico-chirurgicale de la V-e armée" twenty-three cases of ligature of vessels, twenty-two of them practiced three hours on the average after the infliction of the wound. Of these twenty-three cases one terminated fatally. In this instance death occurred suddenly a few moments after the ligature of the femoral vein in Hunter's canal. At the necropsy, numerous infarcts were found in the right lung. In the twenty-two other cases amputation was required in three, and in one of these it was necessitated solely by the bony and articular lesions, the ligature of the anterior tibial artery having nothing to do with it. In the nineteen remaining cases, the postoperative condition was good, and no circulatory troubles were observed even in three cases of ligature of the popliteal vein. From a consideration of these twenty-three cases of ligature of the vessels, Barbarin and Lerat drew the following conclusions: 1. Lesions of the vessels are more frequent than they appear. 2. They exist sometimes in the most unsuspected places. 3. They are benefited almost more than any other war wound by the earliest possible intervention. With regard to the technic of these operations, one has to distinguish between the cases in which the wound is in the usual line for exposing the vessel from those, much more numerous, in which it is situated elsewhere. In the former case it is necessary only to open up the wound and proceed in the classical manner to find the artery in the vein. In the other case, it is better not to yield to the temptation to seek the vessel in the wound because one will only be hindered by the muscles which are infiltrated with blood. It is better after having opened up the wound to cut down on the vessels in the classical position. In this case one has the choice of suturing or not suturing this operative wound. It has been the usual practice to put in a few stitches and to place a package of agar with a tube to permit of dakinization. Dakin's fluid irrigates the wound and flows out by the proper drain with the result that cicatrization is rapidly obtained.

CONDEMNATION OF SOLDIER FOR REFUSAL OF TREATMENT

The Council of War of the fifth corps d'armée, sitting at Orleans, has condemned to three months' imprisonment a soldier who refused to allow mercurial injections on himself, under the pretext that these injections caused pain and other unpleasant consequences. The lieutenant who conducted the prosecution submitted that the accused had no motive to refuse a recognized treatment other than that of wishing to avoid a return to the front, and that in refusing treatment he caused himself to be a danger for others.

WOUNDS OF THE EYEBALL AND EYELID

This subject is being discussed at the Société d'ophthalmologie de Paris, and as the result it is made clear that wounds of the eyeball are serious and that the diagnosis in such wounds in wartime is graver than in times of peace. The reason, of course, is in the nature of the penetrating body. Foreign bodies are not always magnetic. Besides pieces of cast iron or steel, one frequently comes across fragments of stone, lead and copper (in proportion to ⅔) which are not susceptible of being removed by the electromagnet. When a wound of the eyeball presents itself, one should do all one can to save the organ, because even if the visual function is definitely destroyed, it may be possible to fit a movable artificial eye. Enucleation is far too often practiced without sufficient consideration. The object is to avoid sympathetic ophthalmia, but this complication is comparatively rare, and in any case does not manifest itself till the third or fourth week. Every surgeon who is not an oculist, when in the presence of a wound of the eye, should limit himself to (1) disinfecting the eyelids, the eyebrows and the cheek with weakly iodized alcohol, avoiding contact with the conjunctiva and the eye; (2) washing the eyeball and the conjunctival sac with warm physiologic salt solution, and (3) placing an occlusive dressing and sending the wounded man to an ophthalmic surgeon; (4) not in any circumstances, should he practice an enucleation. As regards wounds of the eyelids and neighboring regions, there are two considerations: early operation and later plastic operation. It is characteristic of war wounds involving eyelids that they are almost invariably accompanied by destruction of the eyeball and by lesions of the facial skeleton. They are sometimes very large. The following conduct is recommended in order to reduce the amount of disfiguration: After disinfection of the wound and removal of fragments, it is not good practice to open it up and drain it. On the contrary, it is far better to bring the integuments together, and this is possible without interfering with the drainage. If such wounds are left to granulate spontaneously, the future plastic operations will be compromised and many of the patients will remain permanently disfigured. One should, therefore, be careful to bring the fragments of torn eyelids together, and to respect their surface and that of the conjunctiva; drainage by tubes or wicks is usually quite sufficient. If necessary, one can practice a counteropening. Such wounded should evidently not be kept in the ambulance, but should be sent as soon as possible to the nearest ophthalmic center. Certain of the reconstitutions (plastic operations) can be practiced a few weeks after the infection of the wound, but the more important esthetic interventions are a work of patience. Granted this patience on the part of the surgeon and the wounded, much can be done for the disfigured by means of numerous operations. This kind of work, however, is more suited for the services in the interior of the country, and it will be especially a work of peace time.

Personal

Dr. Charles Paul, medicolegal expert to the tribunal of the Department of the Seine and at present head of the medicolegal service of the army, has just been mentioned in general orders in the following terms:

A physician as remarkable for his learning as for his courage renders distinguished services to the army and to the civil population by his dangerous experiments on asphyxiating gases. By his tireless activity, his perilous missions in the firing line, hastening to any spot where these gases cause danger, he has given proof of the greatest courage and of complete contempt for danger. He has been injured by the action of these gases.

Measures Against Rabies

In a previous letter I noted the diminution of rabies during the period 1910-1914 (THE JOURNAL, July 29, 1916, p. 369). During the last few months there has been a manifest increase in this disease. In Paris and its neighborhood, a district which has seemed during several years definitely freed from this plague, seventeen cases have been reported from March to July, inclusive. This grave situation seems due to the evacuation of houses in the military zone, which has left numerous dogs without domicile. The prefect of police has therefore published an order concerning dogs in the capital. A similar step has also been taken for the Department of the Seine. Henceforward every dog must wear a collar bearing the name of his owner, and must be either led or muzzled. Dogs found on the highway without such a collar, whether muzzled or not, and any dog whose owner is not known in the neighborhood, will be captured and killed. Dogs and cats bitten by a suspected animal will be immediately killed. Suspected animals will be quarantined for observation.

Sale of Poisons

The new law of July 12, 1916, concerning the importation of trade in and the storage of poisonous substances, cocain, opium, morphin and other narcotics, has just been applied for the first time by the Court of First Instance of Paris. A former law of 1845 imposed insignificant penalties—from six days to two months in prison and from 100 to 3,000 francs ($19.30 to $579) fine. Moreover, this law punished only for the sale, the purchase and the use of poisonous substances. Under the new law the penalty has been considerably increased. It varies from three months to two years in prison and from 1,000 to 10,000 francs ($193 to $1,930) fine. Moreover, the simple possession of poisons is punishable in the same way as the selling thereof. In the case mentioned the accused, who derived a considerable income from the sale of cocain, was condemned to one year's prison and 1,000 francs ($193) fine.

LONDON LETTER

LONDON, Oct. 2, 1916.

Sir Lauder Brunton

Sir Lauder Brunton, Bart., M.D., C.M., D.Sc. (Edin.), M.D.R.U.I. (Hon.), LL.D. (Edin. and Aberd. [Hon.]), F.R.C.P. (Lond.), F.R.S., consulting physician to St. Bartholomew's Hospital, died at his residence in London in his seventy-third year. For many years he was easily the foremost authority on pharmacology and therapeutics in this country. A Scotsman, he was born in Roxburghshire, and was educated at Edinburgh, where he graduated M.B., in 1866, B.Sc., in 1867, M.D., in 1868, and D.Sc. in 1870, having in the meanwhile worked at Paris, Vienna, Berlin and Leipzig in the laboratories of the greatest physiologists of the day. Settling in London, he became a member of the Royal College of Physicians in 1870 and a fellow in 1876, and was appointed assistant physician to St. Bartholomew's Hospital, with which he had ever since been connected as physician and lecturer. His earliest important work was a thesis on digitalis in which he conducted most of the experiments on himself and showed that while small doses had little or no action, marked diuresis occurred when the drug was pushed so as to produce symptoms of poisoning. He found, also, that while the diuresis continued, the absolute quantity of solids excreted daily in the urine was increased, although their proportion to the urinary water was diminished. The great aim of his life was to convert therapeutics from an art into a science. As his friend and pupil Dr. Mitchell Bruce says, his "Experimental Investigation of the Actions of Medicine" (1875) was the first systematic textbook on experimental pharmacology, and his "Pharmacology, Therapeutics and Materia Medica," which appeared in 1885, was the first complete treatise on the subject from the standpoint of physiology, not from that of drugs. He formulated completely for the first time, in his thesis on digitalis, in 1866, the action of this drug on the heart and vessels. He introduced in 1867 a new class of remedies—vasodilators—into medicine, in using amyl nitrite as a remedy in disease because its physiologic action was to act in an opposite manner to the pathologic condition which he had discovered in the disease—angina pectoris—namely, rise in arterial pressure. Magendie did the same in regard to strychnin in paralysis; but he recommended it to combat a symptom; Brunton recommended the drug to combat a pathologic condition. He was the first to use scientific opotherapy by administering raw meat in diabetes in order to supply a glycolytic ferment. In his work with A. Macfadyen, he found that bacilli excreted an enzyme by which they attack and digest the soil in which they grow. In this observation he believed that they were anticipated by Salmon. They were, moreover, the first to discover that bacilli have the power of adapting the enzyme they secrete to the soil on which they grow. In 1889 he delivered the Croonian lectures of the Royal College of Physicians of London on the "Relationship between Chemical Structure and Physiological Action," and was thus a pioneer in a subject which has become most important in the present day. Other subjects in which he made his mark were the therapeutics of the circulation and of digestion, the action of snake venom, and the administration of chloroform. He was a lucid writer, and the manner in which he applied the discoveries of the laboratory to the problems of the clinic fascinated his generation. Many of the present day professors of materia medica and pharmacology are his pupils. Perhaps his most important practical work was the introduction into medicine of the drugs which lower blood tension. The story of his well known textbook on pharmacology was characteristic of the man. More than fifteen years before it appeared he had a work on materia medica ready for the press, but he asked the printer to wait a little so that he might make some improvement and remove some redundancies. When he went over the manuscript again he found many unsatisfactory statements and uncertainties which he thought he could remove by a few experiments, but as he went on the labor grew, and not until the end of the period mentioned was he able to produce the book which was the pioneer work of the kind. Many editions appeared both in London and America, as well as translations into French, Italian, Spanish and German. This was the first book in which pharmacology was considered as a scientific study of the physiologic action of drugs, and it exercised a most important influence throughout the world.

A Physician Who "Conscientiously" Objects to Attend to the Wounded

In this country cranks of all sorts flourish, and extreme regard for the rights of the individual allows a latitude unknown on the European continent, whether among our friends or foes. There the "conscientious objector" to military service is never heard of because the right to object does not exist. Here he is drafted into the ambulance corps or given other military work which does not involve the taking of life. But even this is not sufficient for some objectors. The extraordinary and so far unique case of a physician who objected even to attend to the wounded recently came before the Argyllshire Appeal Tribunal. Dr. J. C. MacCallum, tuberculosis officer of the county, appealed for exemption as a conscientious objector. The local tribunal had decided that he had not made out a case for exemption, and suggested that there was nothing to prevent him showing a true Christian spirit by placing his medical skill at the disposal of his wounded fellow countrymen. In his appeal, Dr. MacCallum said that his father was a parish minister who had preached consistently the essential sinfulness of war, and the family had for many years been conspicuously antimilitarist. Current events had done nothing to shake his ingrained repugnance to war. On the contrary, the spectacle of the neverending contest which was drenching Europe in blood had but served to steel his resolution against what was shown clearly to be a crime against humanity. Further, he was unable to realize that there was any logical difference in morality between combatant and noncombatant service. The appeal was dismissed.

Fatigue from the Economic Standpoint

At the meeting of the British Association for the Advancement of Science, the Section of Economic Science had an interesting discussion on the second report of the committee which is inquiring into the question of fatigue from the economic standpoint. The report included a memorandum from Dr. Gwynne Maitland, who during the war in Serbia had special opportunities for observation on accumulated fatigue in warfare. Experience of work in the field led him to useful conclusions which had resulted in some measure of reform in the army. Long continued trench strain gave rise to cases of breakdown in which the patients recovered after a period of rest, but were left with a shorter period of utility on return to the trenches, and on breaking down again were frequently discharged as of no further use. Not only was the period of activity shortened, but also the quality of the work deteriorated, as was shown by inaccurate firing and an inability to time hand-grenade fuses. Under the con-

ditions which existed, it could not be hoped to obtain an ideal working day for each military unit; but with the present greater ability to supply reinforcements, it could be hoped to diminish the strain as well as more frequently to replace the actual fighting units. It became a matter of the greatest urgency that with this ability and with the growing delicacy of perception in the anticipation of the breaking point, a greater discretion might be employed to prevent it.

The report also dealt with fatigue as a cause of accidents, and the applicability of psychology to problems of industrial fatigue. Dr. G. B. Hunter, chairman of a large manufacturing firm, thought the matter of industrial fatigue had been greatly exaggerated. His experience was that so far from there being more accidents when hours were longest, most accidents occurred on Saturday when the working day was shortest. The average working hours in shipyards were thirty-seven weekly in ordinary times, and there was not much fatigue about that. They did, however, find fatigue when a man worked hard and drank whisky with it. Those who did not take drink worked the longest hours and suffered least from fatigue. He believed the average mother of a family grew more tired in a day than any shipyard worker.

Sir Thomas Oliver said that industrial fatigue was entirely the outcome of recent conditions of labor. All reports showed that it existed, and in his opinion it played an important part in the number of accidents which occurred. The hours of munition workers, he suggested, were far too long. It was also a mistake that girls should be working in the factory during the night. Women had done admirably, but we should see that the conditions under which they worked did not injure their health.

The Compulsory Notification of Venereal Disease

Lord Sydenham, president, and Sir Thomas Barlow and the Bishop of Southwark, vice presidents of the National Council for Combating Venereal Diseases, have written to the *Times* on this important subject as follows: "As some misunderstanding seems to have arisen in regard to the attitude of the National Council for Combating Venereal Diseases toward the question of compulsory notification, we desire to point out that we are determined to adhere strictly to the recommendations of the royal commission. That body carefully considered this question, and arrived at the conclusion that notification at the present time was impracticable, and might be detrimental to the operation of the measures it advocated. A great mass of evidence was taken, and the balance was strongly opposed to compulsory methods of this nature. The commissioners, however, recognized that, when public opinion became more enlightened and adequate facilities for treatment had been provided, 'the question of notifications should then be further considered.' They added that when these conditions have been fulfilled it is 'possible that notification in some form will be demanded.' We are convinced that this view is sound, and the national council will, therefore, lend no support to any proposals having for their object the establishment of compulsory notification—proposals which would necessarily lead to controversy at a time when unanimity of effort is essential."

Marriages

Charles Lounsbury Ruggles, M.D., Wellsberg, W. Va., to Miss Phoebe Otto of Cleveland, October 10.

Russell Firth Sheldon, M.D., Boston, to Miss Lura Emma Hewey of Brookline, Mass., October 9.

William H. MacDonald, M.D., Lake Geneva, Wis., to Miss Alma E. Hall of Chicago, October 18.

Adelbert Stephen Dederick, M.D., Brooklyn, to Mrs. Daisy M. Hunter of Summit, N. J., September 27.

John Irwin Gaston, M.D., Madill, Okla., to Mrs. Eula B. Mullins of Oklahoma City, August 14.

Byam Hollings, M.D., Waverley, Mass., to Miss Alice Walker of Norwood, Mass., October 2.

Thomas John Sullivan, Jr., M.D., to Miss Gertrude Scotten, both of Chicago, October 4.

Gordon Hurst Yeo, M.D., to Miss Ernestine Bishop, both of Big Rapids, Mich., October 2.

Paul Hume Crawford, M.D., to Miss Helen McKee, both of Oklahoma City, September 7.

Deaths

William Preston Miller, M.D., Hagerstown, Md.; University of Pennsylvania, Philadelphia, 1894; Baltimore Medical College, 1892; aged 46; a Fellow of the American Medical Association, and formerly president of the Washington County (Md.) Medical Society; local surgeon of the Baltimore and Ohio System; formerly a member of the council of the Medical and Chirurgical Faculty of Maryland; lecturer on pathology in Baltimore Medical College in 1897 and 1898; died at his home, October 6, from double pneumonia.

James W. McMeekin, M.D., Saginaw, Mich.; McGill University, Montreal, Que., 1885; aged 57; a Fellow of the American Medical Association; professor of surgery and clinical surgery in the Michigan College of Medicine and Surgery, Detroit; gynecologist to the Women's Hospital, Saginaw, and formerly surgeon to the Bliss Deaconess Hospital; a specialist in radiology and a fellow of the American College of Surgeons; died at his home, October 3, from angina pectoris.

Josiah L. Wilcox, M.D., Springfield, Ill.; Washington University Medical School, St. Louis, 1860; Illinois Army Board, 1863; aged 80; surgeon of the Eleventh Illinois Infantry, U. S. V., throughout the Civil War; a member of the legislature in 1874 and collector of internal revenue in the central Illinois district; for several years city physician of Springfield; died at the home of his daughter in Smithfield, Ky., October 4.

Saxe Johansen Froshaug, M.D., Benson, Minn.; Keokuk (Iowa) Medical College, 1895; aged 49; formerly local surgeon of the Great Northern Railroad at Hills, Minn.; chairman of the board of health of Rock County and county coroner; a member of the Minnesota State Medical Association; died at his home, October 1, from acute peritonitis, due to a perforating ulcer of the duodenum.

Matthew Woods, M.D., Philadelphia; University of Pennsylvania, Philadelphia, 1873; aged 67; a Fellow of the American Medical Association, and a member of the Philadelphia Psychiatric Society; a veteran of the Civil War; a specialist in the treatment of epilepsy and author of several books and monographs on this subject; died in Philadelphia, October 13, after a surgical operation.

Henry Goodsir Mackid, M.D., Calgary, Alta.; University of Toronto, 1879; L.R.C.P. Edinburgh, L.R.C.S. Edinburgh, L.R.F.P.&S., Glasgow, 1888; aged 58; president of the Dominion Medical Association in 1912; coroner of Alberta and chief surgeon of the Canadian Pacific Railroad; a fellow of the American College of Surgeons; died at his home, August 16, from diabetes.

Elijah Iles Kerlin, M.D., Chicago; University of Pennsylvania, Philadelphia, 1886; aged 62; a Fellow of the American Medical Association and for many years a member of the staff of St. Joseph's Hospital and the Lincoln Park Sanitarium for Sick Babies; who had suffered several years from bronchial asthma; died at his home, October 11, from acute dilatation of the heart.

Arthur LeRoy Hunt, M.D., Washington, D. C.; George Washington University, Washington, D. C., 1905; aged 39; a Fellow of the American Medical Association and corresponding secretary of the Medical Society of the District of Columbia; medical inspector of the health department of the District of Columbia; died in Washington, October 7, from anterior poliomyelitis.

Herbert Marshal Howe, M.D., Bristol, R. I.; University of Pennsylvania, Philadelphia, 1865; aged 72; formerly a practitioner and coal operator at Philadelphia; a director of the Tradesmen's National Bank, Philadelphia, and many other industrial corporations; also a director of the Pennsylvania Academy of the Fine Arts; died at his home, October 1, from heart disease.

George Carleton Dominick, M.D., New York; New York Homeopathic Medical College, New York, 1904; aged 40; attending physician to the Metropolitan and Volunteer hospitals, New York; while returning from a two weeks' trip on the United Fruit Company's steamer *Pastores*; died from tuberculosis, October 2, as the steamer was entering New York Harbor.

John Herbert Mease, M.D., Canton, N. C.; Vanderbilt University, Nashville, Tenn., 1893; aged 44; formerly a member of the Medical Society of the State of North Carolina; a member of the Medical Corps of the North Carolina

National Guard and attached to the Ambulance Company; died in a hospital in Goldsboro, N. C., September 24.

Hawley Nathan Barney, M.D., Richmond, Calif.; University and Bellevue Hospital Medical College, New York, 1900; aged 39; a Fellow of the American Medical Association; formerly president of the Contra Costa County Medical Society and health officer of Point Richmond; died in the Napa Hospital, October 7, from paresis.

David Magie, M.D., Princeton, N. J.; College of Physicians and Surgeons in the City of New York, 1863; aged 75; a member of the Medical Society of the State of New York; for many years a practitioner of New York and attending physician in the heart and lung department of the New York Hospital; died at his home, October 3.

Grace Agnes Murphy Curry, M.D., New York; Women's Medical College of the New York Infirmary for Women and Children, 1897; aged 47; formerly a Fellow of the American Medical Association, and assistant pathologist at the Troy (N. Y.) Hospital; died suddenly on a Hudson River steamer, October 3, while en route to New York.

Louis Corwin Millspaugh, M.D., New York; New York University, New York, 1884; aged 54; formerly a member of the Medical Society of the State of New York; assistant in the Nose and Throat Clinic of the New York Post-Graduate School; was drowned while swimming in the Mississippi River at Red Wing, Minn., recently.

Wellington G. Steele, M.D., Mongaup Valley, N. Y.; Albany (N. Y.) Medical College, 1886; aged 61; formerly a member of the Medical Society of the State of New York; a specialist on diseases of the nose and throat; died at his home, September 10, from acute laryngitis.

John Loper Smith, M.D., Chattaroy, Wash.; Jefferson Medical College, 1890; aged 71; a veteran of the Civil War; surgeon-general of the G. A. R. in 1910-1911 and for many years in charge of the Great Northern Railway Hospital in Chattaroy; died at his home, September 30.

Josiah Hornblower, M.D., Jersey City, N. J.; New York University, New York, 1860; aged 80; a member of the New Jersey Legislature from 1870 to 1872 and for three terms a member of the Jersey City Board of Education; died at his home, October 5.

Tobias John Green, M.D., Mexico, N. Y.; Geneva (N. Y.) Medical College, 1845; aged 98; formerly a member of the Medical Society of the State of New York; said to have been the oldest practitioner in the state; died suddenly at his home, October 4.

Franklin Duane Babcock, M.D., Morrisville, N. Y.; Bellevue Hospital Medical College, 1889; aged 68; for twenty-five years a member of the board of education of Morrisville, and for many years its president; died at his home, September 27.

John W. Hosier, M.D., Spring Valley, Ill.; Medical College of Ohio, Cincinnati, 1873; aged 69; for forty years a practitioner and druggist of Bureau County, Ill.; died in St. Margaret's Hospital, Spring Valley, October 2, from diabetes.

Robert Williams Crawford, M.D., Strasburg, Va.; University of Maryland, Baltimore, 1906; aged 36; chief surgeon of the Atlantic Coast Line Railway, with headquarters at Wilmington, N. C.; died at his home, September 21.

Elizabeth C. Secord, M.D., Farmerston, N. B.; College of Physicians and Surgeons, Keokuk, Iowa, 1881; Northwestern University Women's Medical School, Chicago, 1882; aged 74; died at her home, July 4, from tuberculosis.

Horace W. Coombs, M.D., Cave City, Ky.; Eclectic Medical Institute, Cincinnati, 1870; aged 70; formerly a member of the Kentucky State Medical Society; died at his home, August 9, from carcinoma of the rectum.

Cardinal T. Wolsey, M.D., Buffalo, N. Y.; Howard University, Washington, D. C., 1885; aged 67; for twenty years medical examiner for the U. S. Marine Recruiting Office in Buffalo; died at his home, September 27.

Joachim B. Weintraub, M.D., Chicago; University of Vermont, Burlington, 1893; aged 46; who was shot by a patient in his office, October 9, died the next day in St. Luke's Hospital from his injuries.

Thomas M. McVay, Summerfield, Ohio (license, years of practice, 1896); aged 74; a practitioner and druggist since 1863; formerly treasurer of Noble County, Ohio; died at his home, September 27.

Francis J. Boutin, M.D., Coyle, Okla.; Hahnemann Medical College, Chicago, 1883; aged 61; a member of the Oklahoma State Medical Association; died at his home, August 26, from heart disease.

Herman Bening, M.D., Cibolo, Texas; Eclectic Medical College of the City of New York, 1879; aged 64; a member of the State Medical Association of Texas; died at his home, September 13.

L. R. Metzgar, M.D., Pasadena, Calif.; Long Island College Hospital, Brooklyn, 1866; aged 80; formerly of Wilkinsburg, Pa.; a veteran of the Civil War; died at his home, October 4.

Roy Herbert Nichol, M.D., New York; Rush Medical College, 1911; aged 34; a member of the staff of Kings County Hospital, Brooklyn; died in New York, October 7, from pneumonia.

Timothy Lowthian, M.D., Unionville, Mich.; University of Buffalo, N. Y., 1880; aged 68; a Fellow of the American Medical Association; was found dead in his office, September 30.

Louis L. Lloyd, M.D., Baltimore; Baltimore Medical College, 1904; aged 46; died in the Maryland General Hospital, Baltimore, September 29, from disease of the intestine.

Lewis Hamilton Smith, M.D., Toledo, Ohio; Medical College of Ohio, Cincinnati, 1893; aged 46; was found dead at his home in Toledo, October 2, from heart disease.

George Price, M.D., Altoona, Pa.; University of Pennsylvania, Philadelphia, 1878; aged 68; a veteran of the Civil War; died at Edgegood, Pittsburgh, September 24.

Samah Wilford Lewin, M.D., Sanford, Fla.; Flint Medical College, New Orleans, 1895; aged 44; a colored practitioner; died in Sanford, September 16, from appendicitis.

Claire Adele Verge Taylor, M.D., Peru, Ind.; University of Paris, France, 1868; aged 69; a practitioner of Peru for thirty years; died at her home, September 19.

Edward Severance, M.D., Tacoma, Wash.; University of Oregon, Portland, 1888; aged 61; died in St. Joseph's Hospital, Tacoma, September 26, from nephritis.

John Milton Tobias, M.D., Mitchell, Neb.; Eclectic Medical Institute, Cincinnati, 1872; aged 76; a veteran of the Civil War; died at his home, September 29.

Nathan A. C. Mackie, M.D., Golinda, Texas; University of Tennessee, Nashville, 1881; aged 64; died at his home, September 26, from cerebral hemorrhage.

John William McNamara, M.D., Denver; Medical College of Ohio, Cincinnati, 1901; aged 39; died at his home, September 19, from tuberculous meningitis.

Harry Carter, M.D., New York; University of Vermont, Burlington, 1903; aged 36; died in the Hartford (Conn.) Hospital, July 4, from tuberculosis.

Russell Bingham, M.D., Fitchburg, Mass.; Hahnemann Medical College, Chicago, 1890; aged 65; died at his home, September 23, from acute gastritis.

Byron L. Craft, M.D., Newark, N. J.; University of Buffalo, N. Y., 1893; aged 48; died suddenly in East Elmira, N. Y., September 17, from heart disease.

Benjamin Fagnant, M.D., Springfield, Mass.; Victoria University, Coburg, Ont., 1871; aged 73; died at his home, August 19, from angina pectoris.

Charles Fee Kratzer, M.D., Savannah, Iowa; College of Physicians and Surgeons, Keokuk, Iowa, 1885; aged 55; died at his home, September 17.

William S. Ellsberry, M.D., Bethel, Ohio; Medical College of Ohio, Cincinnati, 1873; aged 64; died suddenly in his office in Bethel, September 9.

William Clancy Peters, M.D., Harrisburg, Pa.; Hahnemann Medical College, Philadelphia, 1881; aged 57; died at his home, September 20.

Oliver L. Hudson, Princeton, Ind. (license, Indiana, 1897); aged 86; for sixty-five years a practitioner; died at his home, September 22.

John D. Mercur, M.D., Towanda, Pa.; Jefferson Medical College, 1878; aged 63; died at his home, September 21, from acute gastritis.

Herschel A. Russ, M.D., Hillsboro, Ohio; Medical College of Ohio, Cincinnati, 1890; aged 47; died at his home, September 23.

Ralph Kenneth Mitchell, M.D., Milwaukee, Wis.; Rush Medical College, 1913; aged 27; died at his home, September 24.

Ezra M. Carr, Pipestone, Minn. (license, Minnesota, act of 1887); aged 78; died at his home, September 15.

The Propaganda for Reform

IN THIS DEPARTMENT APPEAR REPORTS OF THE COUNCIL ON PHARMACY AND CHEMISTRY AND OF THE ASSOCIATION LABORATORY, TOGETHER WITH OTHER MATTER TENDING TO AID INTELLIGENT PRESCRIBING AND TO OPPOSE MEDICAL FRAUD ON THE PUBLIC AND ON THE PROFESSION

NUXATED IRON

It Contains but Little Iron and Practically No "Nux"

Newspapers whose advertising ethics are still in the formative stage have, for some months past, been singing—at so much a song—the praises of "Nuxated Iron." The public has been told that this nostrum is what makes Ty Cobb, "the greatest baseball batter of all time," a "winner" and is what helped Jess Willard "to whip Frank Moran" besides being the "untold secret" of Willard's "great triumph over Jack Johnson."

"Nuxated Iron" is put on the market by the Dae Health Laboratories of Detroit. It "is not a patent medicine or secret remedy"—if one is to believe the advertisements. On the trade package we read:

"FORMULA.—The valuable blood, nerve force and tissue building properties of this preparation are due to organic iron in the form of ferrum peptonate in combination with nux vomica, phosphoglycerate de chaux and other valuable ingredients."

This, apparently, is the company's idea of nonsecrecy. The Dae Health Laboratories also say that they are willing to send to any physician "full information in regard to its ingredients and methods of preparing." So far as we know, no physician has been sent "full information." One physician who did write for this information received in return a form letter addressing him as "Mr. Druggist," and reading in part as follows:

"That you may be conversant with the nature of the product, which we are asking you to sell, we wish to give you the following information which you in turn may give to such of your employees as you may see fit.

"We respectfully ask that this information be regarded as confidential, although there is no harm in your telling your customers that you are familiar with the product and that you believe the ingredients to be beneficial, etc.

"The principle [*sic!*] ingredients in Nuxated Iron are:
"Organic Iron in the form of Iron Peptonate.
"Nux Vomica.
"Glycero Phosphate of Calcium.
"To the above is added a little magnesia, ginger, a laxative and certain other minor ingredients."

THE NATIONAL SUNDAY MAGAZINE

$50,000 Ty Cobb "Comes Back" Nuxated Iron Makes Him Winner—Greatest Baseball

Better of all than says Nuxated Iron filled him with renewed life after he was weakened and all run down. Discloses that "stay there" strength and vim that makes men of mark and women of power

Greatly reduced photographic reproduction of a typical "Nuxated Iron" newspaper advertisement.

As an example of "full information," regarding the "ingredients" and "methods of preparing," this letter left much to be desired, so much in fact that THE JOURNAL felt that it owed it to the public to find out just how much iron and nux vomica there were in "Nuxated Iron." Packages of the nostrum purchased on the open market were subjected to analysis both in the Chemical Laboratory of the American Medical Association and elsewhere. Qualitative tests indicated the presence of iron, calcium, magnesium, carbonate, glycerophosphate and small amounts of potassium and chlorid and the presence of cascara. Quantitative examinations were made and, so far as the essential ingredients—nux vomica and iron—of the nostrum are concerned, gave the following results:

Total nux vomica alkaloids, per tablet	1/500 grain
Iron, (Fe) per tablet	1/20 grain

According to these analyses there is only one-twenty-fifth of a grain of iron in each "Nuxated Iron" tablet, while the amount of nux vomica, as expressed in terms of its potent alkaloids, is practically negligible. If a person wants to take iron on his own responsibility—and this cannot be recommended—it is possible to get this drug in a staple form in the well known Blaud's Pills. In a dollar bottle of "Nuxated Iron" the purchaser gets, according to our analysis, less than 2½ grains of iron; in 100 Blaud's Pills, which can be purchased at any drugstore for from 50 to 75 cents, there are 48 grains of iron. The claim that "Nuxated Iron" possesses great advantages over other forms of iron is the sheerest advertising buncombe.

The exploiters of "Nuxated Iron" would have the public believe that iron is the one thing that most ailing people need. Nothing could be much further from the truth. Iron is a useful and valuable drug in selected cases, but the conditions for which it may be useful are limited. The indiscriminate use of iron is illogical and unwise. Few drugs have been more abused and taken with less discrimination than is iron.

DR. SAUER—STOOLPIGEON

In practically all of the newspaper advertisements of "Nuxated Iron" quotations are given from the alleged statements of one "Dr. E. Sauer" characterized by the nostrum exploiters as a New York "specialist" and as "a well known specialist who has studied widely both in this country and in Europe." Dr. Sauer is *not* well known either as a specialist or anything else save as he has attained notoriety in connection with the "Nuxated Iron" advertisements and through his own advertising in New Haven (Conn.) newspapers, in which he used to cry his wares. From our records it appears that if he ever practiced in New York he did so in violation of the law, for he is not licensed in that state. Emil Sauer was graduated in 1903 by the Jefferson Medical College of Philadelphia; he is licensed to practice in Massachusetts and Connecticut. So far as our records show, and they are remarkably complete, Sauer has never been elected to his local medical society in any of the many localities in which he has practiced. Possibly he never stayed long enough in one place. Since graduating, Sauer seems to have lived in Berlin, Vienna, Worcester, Mass., Boston, Hartford, Conn., Springfield, Mass., and New Haven, Conn. In how many more places he has lived we do not know, as our attempts to locate him since 1914 have failed; this, too, in spite of the fact that the "Nuxated Iron" concern insists that he is "well known."

NOT A PATENTED MEDICINE BUT A "PATENT MEDICINE"

The claim that "Nuxated Iron" "is not a patent medicine" while technically correct is essentially just as false as many of the other statements made in behalf of the nostrum. A true "patent medicine" is one whose composition or method of making, or both, has been patented. It is not secret because its composition must appear in the patent specifications; moreover it must have some claims to originality or a patent would not be granted. What are colloquially called "patent medicines" are really proprietary medicines, products usually secret in composition, that have been given a trademarked name. In the popular meaning of the words, "Nuxated

Iron" is just as much a "patent medicine" as is "Peruna," "Lydia Pinkham's" or "Pierce's Favorite Prescription." "Nuxated Iron" is essentially secret in composition and, while the public is led to believe that the preparation consists chiefly of nux vomica and iron, analyses indicate that it contains much less than an ordinary dose of iron and a negligible amount of nux vomica. It is sold under claims that are both directly and inferentially false and misleading, not only in regard to its composition, but also as to its alleged therapeutic effects. As for the claim that "Nuxated Iron" is the responsible agent for Jess Willard's victory over Jack Johnson or Ty Cobb's "come back," it would be just as reasonable and true to give this nostrum credit for the success of Samson's historical escapade with the jaw-bone of an ass.

So much for the consideration of "Nuxated Iron" from the standpoint of the public. Until the people realize the extent

The Medical Brief
ST. LOUIS, MO.
A Monthly Journal of Practical Medicine

July, 1916. THE MEDICAL BRIEF 21

Iron as a Therapeutic Agent for that Stubborn Case of Anaemia or Mal-Nutrition

IT is well known that Iron administered in the form of Peptonate is more readily assimilated, and less liable to cause gastric irritation than any of the other Iron Salts. For this reason it is used as the base of

Nuxated Iron

Nuxated Iron as a tissue builder and tonic is well worth the careful investigation of every physician who wants results. Its formula is not secret, but follows:—

Iron Peptonate
Calcium Glycerophosphate
Extract of Nux Vomica
Cola-ator
Manganese Carbonate
Potassium Cumate

It is dispensed in 3-grain tablets, put up in bottles to suit the patient $1.00.

While it is true that the public has been told of Nuxated Iron, yet on every bottle is printed a list of each potent ingredient, together with the advice that it be taken under the direction of a physician. We therefore want every doctor in the United States to look into this remedy, knowing well that he will eventually use it in his practice.

SPECIAL OFFER TO PHYSICIANS

In order to give you an opportunity of testing Nuxated Iron in your own practice, we will send for a short time, with our compliments, a full size package of Nuxated Iron tablets, to any doctor now in active practice who will take the trouble to write for it.

Dee Health Laboratories
Woodward Building DETROIT, MICH.

Full page advertisement (greatly reduced) of "Nuxated Iron" in the *Medical Brief*. The *Medical Brief* poses as a medical journal; most physicians know better.

to which they are defrauded and injured by "patent medicine" fakers generally, it is not likely that they will demand a law requiring the manufacturers of "patent medicines" to declare the kind and amounts of active drugs in their preparations. In the meantime, if the public wishes to drug itself with compounds of unknown composition and strength, that is its privilege. But the "Nuxated Iron" humbug has another angle to it, one that directly affects the medical profession. It would seem that there is no nostrum too quackish but certain publications calling themselves medical journals will welcome it into their advertising pages; that there are no "patent medicines" too fakish but certain men who, unfortunately for the public, have the legal right to practice medicine, will prescribe it.

"MEDICAL BRIEF"—NOSTRUM EXPLOITER

The *Medical Brief* has for some months been carrying full page advertisements of "Nuxated Iron." As our readers may remember, the *Medical Brief* has for its editor Thomas G. Atkinson, the "medical expert" for the Wine of Cardui concern in its recent suit against the American Medical Association. It was Atkinson who swore he was an "L.R.C.P. (Lond.)" He also swore that he received his license in 1892 but had since lost it; this in spite of the fact that THE JOURNAL has in its possession a letter from the Royal College of Physicians of London denying that Atkinson ever received such a license.

The publisher of the *Medical Brief* is Henry R. Strong, who also publishes the *National Druggist*, a journal which recently accused the United States judge who sat in the Wine of Cardui case of being partial to the American Medical Association and prejudiced against the Chattanooga Medicine Company. The *National Druggist* has long been a mouthpiece for the "patent medicine" interests and can always be counted on to devote a substantial part of its editorial columns each month to blackguarding doctors in general and the American Medical Association in particular.

Of course the intelligent physician views the *Medical Brief* with the same contempt that the decent druggist bestows on the *National Druggist*. But the layman is not and cannot be so discriminating; to him a "medical journal" is a medical journal. Then, too, it is doubtless a fact that, even if the bulk of the *Medical Brief* circulation is of the "sample copy" variety, there are some physicians who actually subscribe for and support it. It is true that the *Medical Brief* carries advertisements of "Duffy's Malt Whiskey," "Eckman's Alterative," "Micajah's Wafers," "Sal Hepatica" and several other "patent medicines" but to none of these is quite as much space given as to "Nuxated Iron."

It is not surprising, while such conditions as these obtain, that the American Medical Association failed to receive technical justification—as it did receive moral justification—in its recent lawsuit with the nostrum interests. American medicine of today is cursed with two evils, venality and ignorance. The former flourishes among those who, for their own gain, exploit those members of the profession who are afflicted with the latter. The time will come when it will be hard to realize the disgraceful part that some portion of the medical profession has played in furthering the nostrum evil. Education and an awakened professional conscience will relegate such episodes as the "Nuxated Iron" advertisements in the *Medical Brief* to the limbo of a forgotten and dishonorable past.

Correspondence

Postgraduate Course for Resident Staff at Harper Hospital

To the Editor:—Much discussion at present is centered on the requirement of a fifth year for medical students, the year to be a postgraduate year in hospital work. From all indications this plan will soon be adopted generally, and hospitals should be prepared for it.

Aside from the question of a fifth or postgraduate year, the question of intern instruction is important. The intern is using one, two or three years of the best part of his life, after having spent his allotted time in school, trying to prepare himself better to serve the public, and during this period of hospital work he is able to grasp whatever is given him because his time can be so arranged that he can attend a course of instruction. His mind is still receptive; he has not the care of a practice on his hands, and it is the duty of the hospital he is serving to give him all it possibly can for the time which he spends. A hospital is of necessity a teaching institution, has student nurses, and really student or graduate student physicians to maintain its working efficiency. The greater the teaching plan, the greater the efficiency and the more attractive the service.

The intern, of course, has his regular ward work and his special work which he elects to do as well as that required.

Furthermore, he receives individual instruction from the visiting physician in the particular service in which his internship takes him. He does not get a definite correlated course of instruction, however, with a definite plan to it, but rather a hit and miss service as cases happen to come. This, I believe, is true in all institutions and is certainly true in most. It has been felt not only by this hospital, but also by many others, that the interns and resident staff should receive more instruction than they get from the individual visiting physicians or individual cases. Individual case instruction is a necessity and really one of the big reasons for taking a hospital appointment; but with this, a well correlated course of instruction certainly can be made invaluable.

With our large service, we must have a large number of interns. Taking into consideration the residents, assistant residents and interns, we have about forty physicians. With so large a service, we have opportunity to carry out an extra course for interns. Accordingly we have established practically a postgraduate course for the benefit of the house staff. The medical and surgical courses are arranged separately. The course as organized is as follows:

The department of pathology and research will give thirty-six lectures or demonstrations to each service. The lectures for the medical service will embrace the pathology of the blood, sputum, urine, kidneys, spleen, lungs and liver, etc., while the surgical side of the service will be more of a course in surgical pathology, namely, new growths, bone pathology, peritonitis, etc.

The roentgenologic department will in like manner have two distinct courses, one for medical and one devoted more especially to surgical roentgenology. The medical work will be devoted to roentgenology of the chest and intestines, while the surgical will take up fracture work, with, of course, intestinal and kidney work and general roentgenology of the surgical conditions. This course embraces thirty-two lectures each, for medical and surgical service.

The remainder of the medical teaching is divided among the specialties and general medicine. The dermatologic and neurologic departments have divided one hour a week so that each has sixteen lectures. The dermatologic department has elected to show cases by the clinical method, and after the clinic the cases are freely discussed. These cases are obtained from the hospital ward, from the outpatient department and from the instructor's private practice. Thus a wealth of material will be provided.

The neurologic department is for the present at least directing its attention more to psychiatric study than to nerve lesions, as it feels that psychiatry is not a subject ordinarily well brought to the attention of the undergraduate.

The general medical course is planned about as any general medical clinic would be elsewhere, depending on the material at hand and the inclination of the instructor.

The surgical side of the course is arranged much the same as the medical. The roentgenologic and pathologic side has already been described.

The general surgical course has been divided among eight men, each of whom has one month of the course, and will consist of lectures and clinics according to the choice of the surgeon.

The specialties have been divided into four sections of sixteen lectures or clinics each. Proctology and genito-urinary surgery have the first four months, with ophthalmology and allied subjects and gynecology the last four months.

The proctologic outline will include malignant diseases of the rectum, surgical treatment of the ordinary rectal troubles, such as hemorrhoids and fistula, and also instruction in the use of the proctoscope.

The genito-urinary course will include more of the simple genito-urinary problems, such as instruction in catheterization and the treatment of ordinary acute infections of the genito-urinary tract, with final special instruction when possible in cystoscopy.

Ophthalmology, otology and rhinolaryngology will offer instruction and demonstration as the surgeon thinks best, depending on the material at hand.

In gynecology the plan is to give both lectures and demonstrations so that each person may become better acquainted with methods of examination of patients and interpretation of the facts obtained by examination.

These lectures and demonstrations will be given over from time to time to free discussion of the material at hand. The entire course will cover eight months, one hour each day for each service, five days of the week.

The visiting staff has entered into this plan heartily, and we feel that its success is assured. Certainly from the point of view of the intern it is a distinct advance in training.

T. K. GRUBER, M.D., Detroit.
Assistant Superintendent, Harper Hospital.

Physicians Wanted for War Service

To the Editor:—May I venture to ask that attention be called through THE JOURNAL to the shortage of surgeons in the foreign armies. I am prepared to guarantee traveling expenses and full officer's pay to 150 competent men for service on the eastern front.

LOUIS L. SEAMAN, M.D., New York.
247 Fifth Avenue.

Queries and Minor Notes

ANONYMOUS COMMUNICATIONS and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted, on request.

ESSENTIAL ALKALINURIA

To the Editor:—Can you give any information as to the cause and treatment of essential alkalinuria? If continued will it cause irritation of the deeper urinary tract? H. R.

ANSWER.—Alkalinity of the urine is often a physiologic phenomenon due to ingestion of a food rich in vegetables or of alkaline mineral waters. It also occurs during the so-called "alkaline tide" after a meal. Pathologic "essential alkalinuria" results from various diseases of the intestinal tract, the commonest of which is fermentative dyspepsia. It is frequently associated with a marked degree of neurasthenia, and there is often disorder of the sexual organs. As the condition produces a turbidity of the urine, it is apt to be regarded as a sign of "loss of power" by the patient and drives him frequently into the hands of a quack. Alkaline urine is also present in some cases of cancer of the alimentary tract. In children there is a special liability to alkalinuria owing to the excretion of an undue amount of calcium by the kidneys, the normal excretion by the colon being in these cases much decreased. This form has been found occasionally, but by no means invariably, with colitis.

So far as the alkalinity of urine is concerned, the principal dangers are the formation of calculus, and that referred to above, of the effect on the patient's mind.

Treatment should be directed to the cause when known—flatulent dyspepsia, neurasthenia, etc.—by tonics and the usual indications in regard to diet. Specifically the one drug which seems to increase the acidity of the urine with any certainty in a way to meet this condition is acid sodium phosphate. In some cases in which there is an excessive excretion of calcium by the kidneys, diet low in calcium has been recommended, but the rationale is not obvious.

METHOD OF COUNTING CELLS OF CEREBROSPINAL FLUID

To the Editor:—Please describe the method in detail of counting the cells of the cerebrospinal fluid, that is, not a differential count, but the number of cells per cubic millimeter. R. K.

ANSWER.—The following mixture is employed for staining the white and dissolving the red cells: Methyl violet 0.2 gm., glacial acetic acid 5 c.c., water to 100. Fill the blood-counting pipet with stain to the mark I and then fill to mark II with uncentrifuged cerebrospinal fluid. Shake thoroughly, let stand for five minutes and count, using a Fuchs-Rosenthal counting chamber. The ruled surface of the cell contains 3.2 c.mm. of fluid. Count all of the white cells in the entire ruled area, multiply by 11 and divide by 32. The result is the number of cells per cubic millimeters, which varies from 1 to 10 normally.

Medical Education and State Boards of Registration

COMING EXAMINATIONS

ARKANSAS: Regular, Little Rock, Nov. 14. Sec., Dr. T. J. Stout, Brinkley; Homeopathic, Little Rock, Nov. 13. Sec., Dr. Scott C. Runnels, 900 Scott St., Little Rock; Eclectic, Little Rock, Nov. 14. Sec., Dr. C. E. Laws, 712 Garrison Ave., Fort Smith.

CONNECTICUT: Homeopathic, New Haven, Nov. 14-15. Sec., Dr. E. C. M. Hall, 82 Grand Ave., New Haven; Eclectic, New Haven, Nov. 14. Sec., Dr. T. S. Hodge, 19 Main St., Torrington.

FLORIDA: Homeopathic, Jacksonville, Nov. 10. Sec., Dr. J. B. Griffin, St. Augustine.

LOUISIANA: New Orleans, Nov. 30-Dec. 2. Sec., Dr. E. L. Leckert, 716 Macheca Bldg., New Orleans.

MAINE: Portland, Nov. 14-15. Sec., Dr. Frank W. Searle, 776 Congress St., Portland.

MASSACHUSETTS: Boston, Nov. 14-16. Sec., Dr. Walter P. Bowers, Room 501, No. 1 Beacon St., Boston.

MISSISSIPPI: Jackson, Oct. 24-25. Sec., Dr. J. D. Gilleylen, Jackson.

NEVADA: Carson City, Nov. 6. Sec., Dr. S. L. Lee, Carson City.

SOUTH CAROLINA: Columbia, Nov. 14. Sec., Dr. A. Earle Boozer, 1806 Hampton St., Columbia.

TEXAS: Fort Worth, Nov. 14-16. Sec., Dr. J. S. McCelvey, Temple State Bank Bldg., Temple.

WEST VIRGINIA: Parkersburg, Nov. 14. Sec., Dr. S. L. Jepson, State Health Commissioner, Charleston.

Arkansas Homeopathic June Report

Dr. Scott C. Runnels, secretary of the Homeopathic State Medical Board of Arkansas, reports the oral, practical and written examination held at Little Rock, June 1-3, 1916. The total number of subjects examined in was 12; total number of questions asked, 120; percentage required to pass, 75. The total number of candidates examined was 9, all of whom passed. One candidate was granted a reregistration license by examination. The following colleges were represented:

PASSED	Year Grad.	Per Cent.
College		
Hahnemann Medical College and Hospital, Chicago	(1908)	80.3
Hahnemann Medical Coll. of the Kansas City Univ.	(1902)	88
Southwest School of Med. and Hosp.	(1916)	77, 87, 89.2, 91.7, 91.7 92.3, 92.9.

Iowa June Report

Dr. G. H. Sumner, secretary of the Iowa State Board of Medical Examiners, reports the written examination held at Iowa City, June 8-10, 1916. The total number of subjects examined in was 8; total number of questions asked, 100; percentage required to pass, 75. The total number of candidates examined was 50, of whom 48 passed and 2 failed. Seven candidates were licensed through reciprocity. The following colleges were represented:

PASSED	Year Grad.	Per Cent.
College		
Chicago College of Med. and Surg.	(1915) 90.1, 92; (1916)	85.1
Hahnemann Med. Coll. and Hosp., Chicago	(1916)	91
Northwestern University	(1902) 91.5; (1914) 88; (1916)	87
Rush Medical College	(1901) 85.2; (1914) 91; (1915)	89
University of Illinois	(1916) 88.5, 91, 91.1	
Indiana Medical College	(1907)	96
State Univ. of Iowa, Coll. of Med.	(1890) 76; (1916) 85.6, 88.9, 88.9, 89, 89, 89, 90, 90, 90, 90, 90, 90.2, 90.2, 90.5, 90.6, 90.9, 91, 91, 91, 91, 92, 92, 92.1, 93, 93.4, 93.4.	
Johns Hopkins University	(1907) 86; (1914)	93
Harvard University	(1896)	87.8
Tufts College Medical School	(1915)	91.2
Barnes Medical College	(1902)	85.5
John A. Creighton Medical College	(1913)	92
University of St. Joseph, Beirut	(1903)	80.5

FAILED		
Bennett Medical College	(1909)	69.9
Homeopathic Medical College of Missouri	(1903)	66

LICENSED THROUGH RECIPROCITY	Year Grad.	Reciprocity with
College		
Rush Medical College	(1881)	Minnesota
University of Kansas	(1906)	Kansas
National University of Arts and Sciences	(1914, 2)	Missouri
Washington University	(1914)	Missouri
John A. Creighton Medical College	(1915, 2)	Kan., Neb.

South Dakota July Report

Dr. Park B. Jenkins, secretary of the South Dakota State Board of Health and Medical Examiners, reports the practical and written examination held at Deadwood, July 11-12, 1916. The total number of subjects examined in was 13; total number of questions asked, 105; percentage required to pass, 75. The total number of candidates examined was 14, of whom 13 passed and 1 failed. The following colleges were represented:

PASSED	Year Grad.	Per Cent.
College		
Atlanta College of Physicians and Surgeons	(1900)	84.1
Bennett Medical College	(1909)	78.5
Chicago College of Medicine and Surgery	(1916)	86.1
Hahnemann Medical College and Hospital, Chicago	(1909)	87.3
Loyola University	(1916)	87.7
Northwestern University	(1916)	90.7
Rush Medical College	(1915) 85.4; (1916)	85.1
Drake University	(1909)	79.1
Baltimore Medical College	(1909)	81.2
Johns Hopkins University	(1912)	84.3
University of Minnesota	(1914)	85.9
Jefferson Medical College	(1913)	77.5

FAILED		
John A. Creighton Medical College	(1912)	71.5

Miscellany

POLIOMYELITIS ON THE CROW RESERVATION

JOSEPH A. MURPHY, M.D.
Medical Supervisor, Indian Office
WASHINGTON, D. C.

In the course of an epidemic of poliomyelitis on the Crow reservation in Montana, I noticed that contact with previous cases either in the incubation or in active stages seemed to play an important part in the spreading of the epidemic. A special effort was made to trace the source of the disease in the individual cases. Since the epidemic occurred only in a restricted district in the vicinity of Pryor, Mont., where contact with neighbors and others is more or less limited, it was more easy to trace than in more crowded communities.

All of the Indians from the Pryor district were in Billings from July 10 to July 14, and practically all of them were also there August 2 to 6. (The occasions for these visits were in one case a council which was supposed to be held at Crow Agency for the purpose of discussing the opening of the reservation, the families traveling overland as far as Billings and remaining there while the men took the train to Crow Agency, and in the other case the attraction was a sort of wild west celebration.) The Indians on these occasions were camped together on the edge of town, and were in intimate contact with each other, as well as with certain elements of the town population. Whether or not the patients at Billings actually came in contact with the Indian camp is unknown, but it is believed that the original source of the disease was brought to them while at Billings. Whether or not the Indians were in contact with any of the white patients at Edgar, the railroad point for Pryor, is also unknown. The dates of onset of the known cases there are July 28, August 4, August 9 and August 16.

The cases occurred in the following order:

CASE 1.—Leo F., Indian, aged 2 years, living about 1 mile from Pryor, was taken sick, July 25, with high fever, pain on motion and weakness of lower extremities, which later became paralyzed. The fever continued about three days. August 20, he was unable to walk or stand, and cried on being placed upright. The left leg was paralyzed, and the right leg partially paralyzed. The patient is showing gradual improvement.

The source of the disease is believed to be contact in Billings. The family was in Billings from July 10 to July 14.

Known contact with subsequent cases: Daniel L. lived in same household, but moved away. He was taken ill August 7.

CASE 2.—Dan F., Indian, aged 19 years, living about one-third mile from Pryor, was taken sick, July 28, with fever, and pains in the limbs. The fever ranged at about 104 for nearly a week. The left arm showed marked weakness. The flexors of the fingers, the biceps and the deltoid were all affected. August 25, he was able to pull 15 pounds against a spring balance with the left hand and arm, and the muscles seemed to be gradually regaining their tone.

The source of the disease is believed to be contact in Billings.

CASE 3.—Frederick S., Indian, aged 3, was taken ill, August 1, with fever (103 F.), and died, August 2, with laryngeal paralysis.

The source of the disease is believed to be contact in Billings. The family was in Billings from July 10 to July 14.

Case 4.—Simpson S., Indian, aged 8 years, was taken ill on the same date as his brother (Case 3) with high fever, and somewhat similar symptoms, but without paralysis. He was believed to have an abortive case.

Case 5.—Gilbert G., Indian, aged 1, was taken sick, August 3, with high fever, irritability, and marked trembling all over. The child trembled constantly while awake. The fever lasted about three days, after which it was noticed that the legs were limp. There was also marked tendency to throw the head back. At present there is slight paralysis of the right leg, and weakness of arms, gradually improving.

The source of the disease is believed to be contact in Billings. The family was in Billings from July 10 to July 14. They are also related to the family of Patient 2, and visited there.

Known contact with subsequent cases: The G. family with the baby took dinner and visited in the home of Patient 7 one week previous to the time Patient 7 was taken ill. The G. baby was taken ill three days after this visit.

Indirect contact with subsequent cases: Four members of the patient's family were at a dance at Pryor, August 5, coming from direct contact with the patient.

Case 6.—Daniel L., Indian, aged 2½ years, was taken sick, August 7, on the road from Billings. The most prominent symptoms were digestive disturbances. He became paralyzed in both legs, August 8. At present both legs are partially paralyzed. The right leg has a slight patellar reflex. The left leg has no reflex, and is flaccid. The patient's condition is improving.

The source of the disease is possibly Billings. The family was there from July 10 to July 14 and from August 2 to August 6. The patient was also in contact with Patient 1, who was taken ill July 25.

Case 7.—Julia S., white, aged 5 years, was taken ill, August 7, with high fever and pain in the back, legs and chest. The left leg became paralyzed, August 8. At present there is paralysis of the flexor muscles of the left thigh. The patient is gradually improving.

The source of the disease is direct contact with Patient 5 and his family, July 30.

Indirect contact with subsequent cases: Mutual visiting between this family and the family of Patient 8.

Case 8.—Amy B., white, aged 12, was taken ill, August 11, and died August 14. She had high fever, aching in the limbs, and paralysis. The cause of death was reported to be paralysis of respiration.

The patient visited Billings, July 31, and was also in indirect contact with the home of Patient 7. She attended a dance at Pryor, August 5, at which four members of the family of Patient 5 were present. The latter came from direct intimate contact with Patient 5, then at the height of the disease.

Direct contact with subsequent cases: The patient may have been in the incubation stage of the disease at the time of the dance. Patients 11 and 12 developed the disease, August 17, and both were present in contact with Patient 8 and the family of Patient 5. Patient 8 also paid a three-hour visit in the home of Patients 10, 13, 14, 15 and 17, August 10, when she was beginning to feel ill. Following this visit five of the children became ill on the following dates: Patient 10, August 14; Patient 13, August 17; Patients 14 and 15, August 20, and Patient 17, August 22.

Case 9.—Mary B., Indian, aged 5 years, was taken ill, August 13, with fever, headache, cough and pulmonary symptoms. Paralysis was noticed, August 15. The case rapidly became serious, and was complicated by pulmonary infection. After being critically ill for a week or more, the patient began to improve. At present, there is almost complete paralysis in both legs.

The source of the disease was contact in Billings, from July 10 to July 14, and from August 2 to August 8. The patient was possibly in contact with Patient 6, who was in Billings at the same time. Furthermore, the patient lives across the road from Patient 2, and there may have been direct or indirect contact between the two families.

Case 10.—Orpha M., white, aged 10 years, was taken ill, August 14, with fever, and aching in the limbs and head. There was no paralysis, but there were symptoms similar to paralytic cases.

The source of the disease was direct contact with Patient 8, August 10.

Case 11.—Rose L., Indian, aged 16, was taken ill, August 17, with fever, headache, and aching of the neck and right arm. The symptoms continued for several days, but no paralysis developed.

The source of the disease was contact with Patient 8 and the family of Patient 5 at the dance, August 6. Members of the family of Patient 8 attended a party at the home of Patient 11, August 7. Patient 8 was invited, but could not come on account of her illness, which began on that date.

Case 12.—Elwood C., white, aged 19 years, was taken ill, August 17, with chill, vomiting and spitting of blood. He then felt better for a few hours, but gradually became worse, and had high fever and pain in the back and hips, and was unable to swallow; he was delirious while dozing. On the third day the left deltoid became paralyzed. The paralysis gradually traveled down the arm, extending to the pectoral muscles and diaphragm. Death, due to paralysis of respiration, occurred on the third day of the disease.

The source of the disease was contact with Patient 8, and with members of the family of Patient 5 at the dance at Pryor, August 5. The patient lived in an isolated section of the reservation, and is reported not to have been away from home at any time except when he attended the dance at Pryor, August 5.

Case 13.—Wayne M., white, aged 2 years, was taken ill, August 17, with fever (101.4); the pulse was 162; there were restlessness and evident weakness of the left leg. The mother stated that the child had a fall and injured the leg, but there was no bruising or evidence of trauma. The fever lasted four days. The left leg became slightly paralyzed, but showed gradual improvement.

The source of the disease was contact with Patient 8, August 10, also with Patient 10 in the same home.

Case 14.—Zelda M., white, aged 13, was taken ill, August 20. The temperature was 103.2. There were headache, sore throat and aching all over. The patient hated to be moved. She had a slight chill at onset. The tonsils were enlarged, but not inflamed. The fever lasted three days, gradually reaching normal. Both legs were weak, and on first attempting to stand the patient fell over. Strength in the legs quickly improved, but the patellar reflexes were absent for a few days.

Case 15.—Verne M., white, aged 6, was taken ill, August 20, with fever and aching in the body and limbs. The temperature gradually became normal after a few days. There were no paralytic symptoms.

The source of the disease was contact with Patient 8, August 10, and with Patient 10.

Case 16.—Wilson L., Indian, aged 14 months, was taken ill, August 21, with fever, restlessness and irritability. August 22, the temperature was 101.4; the feces were soft; there was coryza; there were rales in the chest. The right eye turned up and in toward the nose at times. There was paralysis of the right side of the face. It was impossible to close the right eye. Milk dribbled from the right cheek. The high temperature lasted two days, gradually becoming normal, but paralysis of the face continued with very slight improvement. The child is now apparently normal except for the facial paralysis. The mother thought there was slight weakness of the right arm and leg, but was not positive.

The patient was in Billings from August 4 to August 7. He is related to the family of Patient 9, which was in Billings at the same time. Patient 9 was taken ill August 13, and the family of Patient 16 was in contact.

Case 17.—Ross M., white, aged 4 years, was taken ill, August 22, with fever. The temperature was 103, the pulse 140. The patient vomited, and had pain in the back and the right leg. The back was slightly tender, the throat slightly red. The high temperature lasted two days, gradually returning to normal. There were no paralytic symptoms.

The source of the disease was contact with Patient 8, August 10, and with cases in his own family.

While there may have been other means responsible for the spread of the disease, it seems apparent that actual contact with patients having active cases, or cases in the incubation stage of the disease has largely been responsible for the spread of poliomyelitis on the Crow reservation. It is worthy of note that no Indians from other sections of the reservation were in Billings except the Pryor Indians, and the disease has been confined to the group which were associated with each other there. Spread to the white persons on the reservation seems to have been largely from Indian sources. The family of Patient 5 had a breakdown on the road near the home of Patient 7, and while the wagon was being repaired they were invited to take dinner there. Patient 5 was in the incubation stage of the disease at the time, and exactly one week after this visit, Patient 7 was taken ill with the disease. Whether Patient 8 was the source of infection at the dance at Pryor, August 5, or the infection was spread by the members of the family of Patient 5, who left the bedside of Patient 5 and went direct to the dance, is impossible to say. It is undoubtedly true, however, that the dance was responsible for the infection of Patient 12, who had been isolated at home for months, and whose only touch with the sources of infection was his attendance on the dance. The infection must have been very virulent, since two of the persons who attended this dance died.

It is also of interest to note the infection in the family of Patients 10, 13, 14, 15 and 17. There are seven children in this family, and following the visit of Patient 8, five of them, after an average incubation period of seven and a fraction days, were taken ill with abortive symptoms of the disease.

Dr. Benson of Fromberg, who had charge of a number of patients at Edgar, some of whom I saw, and also Dr. Arnold of Billings reported a number of cases of abortive symptoms. At Edgar there were two abortive cases in one family. Several days later a third child was taken with the same symptoms, but developed paralysis of both arms and legs. I feel confident that the infection in the family of Patients 10, 13, 14, 15 and 17 was the abortive type of infantile paralysis.

Every home in the Pryor district was visited, and all members of the family examined for the disease. Strict quarantine was maintained on the entire district, and all the Indians compelled to clean up their homes and keep their children at home. Only the men were permitted to go out, and then only on urgent business. This seems to have been successful in checking the further spread of the disease.

Medicolegal

When Vaccination May Still Be Required

(Bright vs. Beard (Minn.), 157 N. W. R. 501)

The Supreme Court of Minnesota reverses a judgment obtained by the plaintiff for alleged violation by the defendant, a member of the board of education of the city of Minneapolis, of Section 2900 of the General Statutes of 1913, which provides that any member of any public school board or board of education of any district, who, without sufficient cause, etc., shall vote for the exclusion from school privileges of any person entitled to admission to the schools of such district, shall forfeit to the party aggrieved $50 for each offense. It appeared that a case of smallpox had developed in the public school wherein the plaintiff was a pupil, and that the defendant, as a member of the board of education, had voted for a resolution which, in effect, required the pupils in that school who had been exposed to the contagion to be vaccinated and in default thereof to be excluded from attendance until the lapse of two weeks. The court says that the defendant could not be penalized for the act of the health commissioner or the superintendent of the schools. The court also thinks it fairly appeared that the trial court's finding of want of sufficient cause for the defendant's affirmative vote on the resolution adopted by the board of education was based on an erroneous conception of the effect of a statute, and not on facts, assuming that the plaintiff was a pupil covered by the resolution. From the time said Section 2900 appeared on the statutes, in 1877, down to the enactment of Chapter 299 of the Laws of 1903 (which was revamped and inserted by the revisers in subdivision 8 of Section 2131 of the Revised Laws of 1905; Section 4640 of the General Statutes of 1913), no one could have made a plausible contention that exposure of a school pupil to a virulent contagious disease, such as smallpox, did not constitute sufficient cause for excluding such pupil from attendance during the period that there was danger of imparting such disease by such pupil to others in the school. Did said Chapter 299, Laws of 1903, change the situation? The court thinks not. That law was designed to prohibit compulsory vaccination, and also to prohibit school authorities from making vaccination a condition precedent to the enjoyment of school privileges except during the prevalence of an epidemic of smallpox. It has nothing to do with the status of school pupils who have been exposed to a contagious or infectious disease whether of smallpox, scarlet fever, diphtheria, or the like. It is unreasonable to surmise that this law of 1903 was intended to prevent school authorities from taking the usual precautions to prevent the spread of contagious diseases through pupils who have became exposed to contagion. The temporary exclusion from school attendance of such pupils is still left to the good judgment of the authorities. The resolution here in question went no further than to deal with pupils who had been exposed to contagion from the dread smallpox. The facts found showed that one of the pupils attending the school became a victim of the disease and had exposed others therein to contagion. This furnished sufficient cause for the adoption of the resolution on which the defendant voted, and the finding that no epidemic of smallpox then prevailed in the city was not important. In 1902, in State ex rel. vs. Zimmerman, 86 Minn. 353, a regulation requiring children to be vaccinated as a condition precedent to attendance in a public school during an epidemic of smallpox was upheld as reasonably necessary. And the exception in the law of 1903 recognizes the principles announced in the decision. A person carrying the germs of infection may spread the disease perhaps as readily before the disease has become epidemic as after it has arrived at that stage. Unless the power still remains in the school authorities to exclude temporarily those from school attendance who have come in contact with smallpox patients, we may expect epidemics of that disease to be started in short order in the public schools. The court does not believe a reasonable construction of the statutes herein referred to invites such calamities.

Society Proceedings

COMING MEETINGS

American Public Health Association, Cincinnati, Oct. 24-27.
Clinical Congress of Surgeons, Philadelphia, Oct. 23-28.
Kentucky State Medical Association, Hopkinsville, Oct. 24-27.
Southern Medical Association, Atlanta, Nov. 13-16.
Virginia State Medical Society, Norfolk, Oct. 24-27.

INDIANA STATE MEDICAL ASSOCIATION

Annual Session, held at Fort Wayne, Sept. 28 and 29, 1916

The President, DR. GEORGE F. KEIPER, Lafayette, in the Chair

Advanced Ectopic Pregnancy

DR. EDMUND D. CLARK, Indianapolis: A woman, aged 28, was in her fourth pregnancy at term. Pregnancy was apparently normal, except for an unusual amount of abdominal pain and nausea. Fetal movements were observed between the fourth and fifth months, and continued in a normal way until three weeks before her admittance to the hospital. At the end of the tenth month an attempt to bring on labor resulted in an infection of the uterus, necessitating removal of the fetus, placenta, infected uterus and tubes. The mother made an uneventful recovery. She is now in perfect health.

DISCUSSION

DR. CHARLES M. MIX, Muncie: The primary pain of ruptured ectopic pregnancy is said to be in the lower abdomen. That has not been my experience. In the majority of cases it has been epigastric or umbilical, and it settles down into the lower abdomen exactly as the primary pain of appendicitis settles down into the right iliac fossa.

DR. CHARLES STOLTZ, South Bend: It is very essential to recognize cases of tubal or extra-uterine pregnancy early, and then operate to guard against danger which may follow. I do not suppose any one would recommend waiting if he know there was a tubal pregnancy.

DR. J. W. MCCAUSLAND, Fort Wayne: In the last five months I have seen eight cases of advanced ectopic pregnancy with rupture. Seven patients left the hospital recovered, while the eighth died. The great difficulty in ectopic pregnancy is to make the diagnosis. After the diagnosis has been made, the surgery is easy.

DR. H. A. DUEMLING, Fort Wayne: I recall the case of a woman, aged 21, in which the diagnosis of ectopic pregnancy was made in the early months. I saw the patient about two months later. At this time the abdomen was filled with a large fluctuating tumor. She had considerable elevation of temperature and a rapid pulse. A diagnosis was made of suppurating ovarian cyst. On opening the abdomen we found a full-term child.

DR. H. H. MARTIN, Laporte: The tendency to spontaneous hemorrhage is governed a great deal by the site of the rupture. I had an experience with two cases illustrating that point. The first patient was quite a large, full-blooded woman about six or seven weeks pregnant. Rupture occurred at 8 o'clock in the evening; in probably fifteen minutes after the onset of the pain she was pulseless. The patient was operated on at 11 o'clock. At that time it was impossible to count her pulse, and she seemed to be dying. The rupture occurred in the tube, and right through the placenta. There was an enormous amount of blood in the abdominal cavity, and it seemed as though the woman would bleed to death in a short time. On going through the peritoneum the blood spurted up like a fountain. The second patient was seized with a sudden pain; she was operated on four hours after the onset of the pain. The hemorrhage had been entirely from the fimbriated end of the tube and was not large in amount. The pain was not as severe as in the other cases.

DR. A. M. HAYDEN, Evansville: The mere fact that a patient bleeds to death warrants us in operating in all of these cases as soon as the diagnosis is made. The ideal time to operate is before rupture.

DR. A. S. JAEGER, Indianapolis: I saw a case two months advanced in pregnancy in a married woman who absolutely

denied pregnancy and claimed that hemorrhage was due to the fact that she had some menstrual disturbance which necessitated a vaginal examination. She gave a history of never having stopped normal menstruation. Her word was accepted, and a diagnosis was made of hemorrhage into the broad ligament. Operation revealed a three months' pregnancy with the placenta attached to the posterior aspect of the broad ligament. The placenta had become partially detached and the hemorrhage was the symptom.

Dr. Alfred F. Schmauss, Alexandria: In cases of extra-uterine pregnancy, operation should be performed before rupture takes place. Valuable time is lost in trying to make a positive diagnosis.

Dr. J. W. Shafer, Lafayette: The time to operate is before rupture has taken place, but many patients come to us only as the result of hemorrhage. The incidence of fibroid tumor and extra-uterine pregnancy has been remarkable to me.

Dr. D. S. Wiggins, Newcastle: In the last two years I have seen ten cases of tubal pregnancy. In six of these, rupture had taken place. Four were unruptured, and operation was performed for twisted pedicle, appendicitis or something else. While it is ideal to operate before rupture, we do not frequently see these patients before rupture has taken place. Whether the surgeons would do any better in diagnosis than the general practitioner is a question.

Dr. George R. Andrews, Muncie: In a case of abdominal pregnancy, the placenta was attached to the posterior aspect of the broad ligament. Another woman manifested nothing unusual in the course of her gestation, except that she did not go to labor at what was supposed to be full term. She went on for about two months, when she was referred to me. I recognized an abdominal pregnancy, and operated, finding a dead child. This woman had a fibroid tumor of the uterus.

Dr. Charles D. Terry, South Bend: No man can make a diagnosis of tubal pregnancy by vaginal examination, bimanual or otherwise, and feel certain as to the diagnosis if he ignores the history of the case. All cases of tubal pregnancy give a distinct and positive history as regards menstruation. There is an irregularity as to time or amount and character of the discharge, the discharge being mucous or slimy, which suggests tubal pregnancy.

Dr. John Sluss, Indianapolis: We all are agreed that immediate operation in these cases is indicated, but I do not regard rupture of a tubal pregnancy so grave an emergency as I formerly did. It is exceptional that an artery of any size is torn or ruptured. The symptoms of gravity in the early stages of rupture are very frequently those of shock. It is impossible in such cases to differentiate between shock and hemorrhage.

Conservatism in Cesarean Section

Dr. J. W. Shafer, Lafayette: Cesarean section is indicated only in cases in which the pelvis is too small to admit of delivery of a living child. Eclampsia, placenta praevia, malpresentations and tumors are indications for cesarean section only when accompanied by other complications. "Once a cesarean section, always a cesarean section," is a safe and sane axiom. A pelvis justo minor to the extent of 5 cm. with dead child is a positive indication for cesarean section, except when the patient has been submitted to frequent examinations and attempts at delivery, or is exhausted by prolonged labor, dilatation is partial or complete, membranes are ruptured, the child is injured by instruments, and there are signs of weakness of the child. Then cesarean section is contraindicated, and craniotomy and embryotomy are methods of choice and safer for the mother.

DISCUSSION

Dr. A. S. Jaeger, Indianapolis: A justo minor pelvis is not the only indication for cesarean section. There are many other indications, largely individual, which are just as absolute. Cesarean section in eclampsia is a question of personal opinion and experience. We must not adapt the patient to the operation, but rather adapt the operation to the patient. If a patient is seen early enough, or if the physician has nursed the patient along, the patient may not have to undergo a cesarean section for eclampsia.

Dr. Thomas B. Eastman, Indianapolis: Anybody can do a cesarean section, or can learn to do it, in ten minutes, provided he knows how to be clean; but it requires more skill to do a version or to make some of these forceps deliveries.

Dr. Louis Burkhardt, Indianapolis: It is not necessary to perform so many cesarean sections; if the practitioner is skilled in doing version, many cesarean sections can be avoided.

Dr. Charles C. Terry, South Bend: It requires more courage on the part of a surgeon to be conservative than it does to be radical. What would be the objection to the principle, "once a cesarean section always a cesarean section"? Where a woman has difficult labors, requiring long forceps deliveries, it would be better to have a cesarean section done, but we should be careful to make the correct diagnosis.

Hyperthyroidism and Its Relation to Certain Pelvic Disorders in Women

Dr. Thomas B. Eastman, Indianapolis: There is a close physiologic interrelationship between the ovaries and the thyroid, with the result that in certain circumstances any affection of either one may produce abnormal conditions in the other. Thyroid secretion and ovarian secretion do not supplement each other; they neutralize each other.

DISCUSSION

Dr. Maurice I. Rosenthal, Fort Wayne: The interrelationship between the genital organs and the thyroid is nicely shown in some cases of exophthalmic goiter in which pregnancy takes place. In two cases in women about two or three months pregnant, I was afraid to operate because of symptoms referable particularly to the heart. I watched one woman for quite a while; I gave her the rest cure. About the second month the circulation of the heart had improved to such an extent that we did a thyroidectomy. She went along nicely with her pregnancy and was delivered at full term. That experience has occurred twice in my practice.

Dr. H. A. Duemling, Fort Wayne: The fact that the thyroid is more or less closely associated with the sex glands presents itself in various ways, such as the enlargement of the thyroid in young girls at puberty, and in females generally at the time of menstruation.

Dr. Charles M. Mix, Muncie: Infection may be the activating and underlying cause of this disturbance. Not long ago some man, whose name I have forgotten, demonstrated streptococci in the so-called cystic ovaries. Cystic ovaries, with dysmenorrhea, and hyperthyroidism, especially in a goitrous region, may be associated conditions in which the streptococcus is the active factor.

Dr. A. F. McDonald, Warsaw: Some years ago our attention was called to cases of amenorrhea at times following confinement and associated with a gain in weight, and also occurring in young girls who gained appreciably in weight, and had amenorrhea. I have given these patients thyroid extract, and I can recall at present possibly half a dozen cases in which loss of weight and a free menstrual flow resulted. I mention this as showing the connection between the thyroid and the ovary.

Dr. H. O. Bruggeman, Fort Wayne: The ovaries are not the only sex glands. The pineal gland is absolutely a sex gland, and tumors of this gland exert a profound influence on the development of the sexual organism. The same is true of the hypophysis. There is also an intimate relation between the thymus and thyroid.

Dr. Miles F. Porter, Fort Wayne: Regarding the influence of hyperthyroidism on pregnancy and vice versa, my experience is in accord with what has been said. A patient with extreme hyperthyroidism stops menstruating. She also loses flesh. She goes on until her thyroid is used up; her menses do not return, but her flesh does. A pregnant woman without a thyroid slightly hyperactive is in considerable danger from toxemia or, if she goes through labor, from infection. Our observations teach us that a slight hyperactivity of the thyroid is a normal condition to a woman bearing children if she has to carry that child without undue risk. On the other hand, a woman with an extremely hyperactive goiter may have

hemorrhages and lose her child. When she has her goiter removed, or a part of her goiter, she regains her health and becomes mother to a family. Many of these things seem very contradictory.

Occlusive Drainage for Empyema of the Chest

DR. MAURICE I. ROSENTHAL, Fort Wayne: The diaphragm itself offers sufficient motive power to evacuate the chest, and if resort is had to a proper valve, air can be prevented from entering. To accomplish this I devised the following operation: The tube is inserted into the chest by means of a specially constructed trocar and cannula; it is fixed to the chest by means of adhesive plaster. It is left hanging dependent about 24 inches to act as a discharge tube and at the same time a siphon. The end is cut at a long angle. Over this is placed a very thin rubber tube somewhat larger than the drainage tube. This tube is tied in place so that it overhang the drain about 3 inches. The thin tube will act as a valve excluding air from the chest on expiration and allowing the escape of pus and consequent approach of the lung to the ribs on each inspiration. The thinner the tube the better the valve action. Sterile adhesive plaster should be used, as it is much less irritating about the wound. The operation can be performed in about one minute under local anesthesia. When the cavity is quite obliterated and there still persists a slight amount of drainage, the tube is removed and a braided bundle of silkworm gut is substituted. In a few cases I have occasionally poured from one-half to 1 ounce more or less of sulphuric ether through the tube into the chest to act as an antiseptic.

(To be continued)

AMERICAN ASSOCIATION OF OBSTETRICIANS AND GYNECOLOGISTS

Twenty-Ninth Annual Meeting, held at Indianapolis, Sept. 25-27, 1916

The President, DR. HUGO O. PANTZER, Indianapolis, in the Chair

Appendicular Abscess, Complicated by Hemorrhage and Death

DR. MAGNUS A. TATE, Cincinnati: This condition is rare. The patient was a young woman who had her first attack. The abdomen was opened through the right rectus, and drainage was profuse for six days. At the end of the eleventh day her condition was good. On the twelfth day she complained of pain and nausea. On the morning of the thirteenth day there was hemorrhage from the wound, and on the fourteenth day her condition was alarming, death occurring the same evening. Necropsy revealed a gangrenous sac, the size of a dollar, in the mesentery, probably the site of hemorrhage.

DISCUSSION

DR. ALBERT GOLDSPOHN, Chicago: After a normal course following a vaginal hysterectomy in a septic case, the patient began to bleed about two weeks after the wound had nearly closed. After futile attempts to stop the hemorrhage by local tamponning, and the use of clamps, I saved the patient's life by doing an abdominal section and ligating the internal iliac arteries.

Drainage for Pus Conditions in the Pelvis During Pregnancy

DR. FRANCIS REDER, St. Louis: The most frequent cause of a pus accumulation in the pelvis during pregnancy is a diseased appendix. If the pains and frequent indispositions which usually accompany the pregnant state are not promptly interpreted the primary clinical picture of appendicitis may be recognized only when the more serious phases of the disease have manifested themselves. Before any pus formation has taken place, the pulse and temperature may show little or no change. The pain is usually located in the epigastric region, and remains there until the disease has reached the stage when all pain ceases. Even in an advanced pregnancy, a readily recognizable rigidity of the right rectus is seldom encountered, and only exceptionally does palpation reveal a tender spot over McBurney's point. Nausea and vomiting count for naught because they are frequently associated with the toxemia of pregnancy. Pregnancy favors the rapid development of appendicitis, and pus may be found in the pelvis in a very short time. The most satisfactory and convincing evidence as to the presence of pus in the pouch of Douglas can be obtained by a rectal examination. In the treatment of a pelvic abscess complicating pregnancy, two factors become absolutely axiomatic; first, prompt recognition of the collection of pus, and, second, the simplest surgical measure for relief. An abdominal operation can be done with less risk of interrupting pregnancy before the fourth month than after. Great antipathy still exists as to attacking a pelvic abscess through the rectum, largely because of the likelihood of infecting the abscess cavity. Patients relieved in this manner have usually suffered no untoward results, and their recoveries have been satisfactory.

DISCUSSION

DR. HERMAN E. HAYD, Buffalo: In cases of appendicitis complicated with pregnancy, miscarriage is apt to take place. Undoubtedly a bacteremia is established, and the fetus is made ill by the infected blood. The point brought out of opening the abscess through the rectum is a good one.

DR. W. A. B. SELLMAN, Baltimore: One method of dealing with these abscesses is that suggested of opening through the vagina posteriorly into the culdesac and by that means reaching the abscess. The second method is opening the abscess through the rectum. In two cases I selected the abdominal route, draining the abscess cavity. My experience is that it is necessary to drain the cavity for a long time.

DR. ROLAND E. SKEEL, Cleveland: As regards making a puncture through the rectum in these abscesses, I have used that procedure for ten years, but I would emphasize the fact that there must be an abscess cavity. If there is no abscess cavity, with a thin wall, it would be dangerous on account of peritonitis or rectal infection. I can recall cases of appendicular abscesses which opened and drained through the rectum spontaneously.

Case of Rupture of Uterus; Sepsis; Operation; Recovery

DR. RUFUS B. HALL, Cincinnati: My patient was operated on thirty-seven days after delivery. She made a slow but satisfactory convalescence, and is now perfectly well. Rupture of the uterus during labor is a rare and dangerous accident. From the history of the case and the subsequent findings at the time of the operation, I ask the question if it is possible that the unrecognized small rupture, causing leakage into the abdomen, might not be more frequent than is generally believed. My case would suggest that as a possibility, because there were no symptoms which would suggest rupture, and it was not suspected until revealed at the time of the operation.

DISCUSSION

DR. HENRY SCHWARZ, St. Louis: There should be some history accounting for cicatricial tissue or some weakening in the uterine wall. Without such a history, and without the symptoms of scar, tallying with the symptoms of rupture of the uterus during delivery, I should hesitate to accept this case as one of rupture of the uterus occurring at the time of delivery.

DR. EDWARD J. ILL, Newark, N. J.: I do not think Dr. Hall's patient had a rupture of the uterus. Rupture of the uterus always occurs in the lower and hardly ever or never in the upper segment. He speaks of no blood being in the abscess. There must have been some blood there if the woman had a rupture of the uterus. I have seen many cases of chronic suppurative metritis following labor in which abscess occurred near the anterior horn; and after being opened and drained, the patient got well, provided it was a single abscess.

DR. J. HENRY CARSTENS, Detroit: Might not this case have been one of embolism of the uterus, in which the muscle tissue degenerates slowly, breaks loose, and finally there results an infection of the abdominal cavity?

DR. ROLAND E. SKEEL, Cleveland: Rupture of the uterus belongs to one of two categories—those cases in which there

is a disproportion and after a prolonged labor there is a thinning out of the lower uterine segment and rupture occurs in the uterine cavity. In the other cases, in which degeneration of the uterine muscle takes place, rupture may occur early in labor anywhere in the body of the uterus.

Dr. Sylvester J. Goodman, Columbus: In one of two cases which occurred in our service in the last few months, the diagnosis was not made until a week after the rupture occurred. Infection took place with general peritonitis and pus everywhere. The abdomen was opened, and a dead, macerated fetus removed, hysterectomy done and abdominovaginal drainage instituted. The woman recovered. The other was a case in which the diagnosis was made promptly by the attending physician. Appendectomy was done, abdominovaginal drainage instituted, and the patient made an uneventful recovery.

Dr. O. H. Elbrecht, St. Louis: If you recall the different types of bicornate uteri and the different types of double uteri, occasionally you will see one that is open or very thin, and there is a disproportion between the one uterus and the other, the one being parasitic to the other, the tubes and ovaries being only two in number. There is a possibility that Dr. Hall's case was one of this type, as the patient did not manifest any of the classical symptoms of a typical rupture of the uterus.

Dr. James E. Davis, Detroit: Cullen some years ago reported 150 cases of cysts occurring from the wolffian duct remains between the anterior part of the uterus and bladder. Last year I had such a case. The cyst had become infected—in fact, most of these cysts become infected and are recognized following obstetric deliveries. In my case the woman manifested a septic temperature, beginning on the fourth day, which continued for about eight weeks. When she came to operation, an abdominal section was done and nothing was found to account for the conditions until I began to separate the bladder from the anterior portion of the uterus, and then I opened into a cystic cavity, which was infected, and which I diagnosed as belonging to this type of cyst. Dr. Hall's case might belong to this class of cases.

Dr. E. Gustav Zinke, Cincinnati: There is an absence of history of injury, and if a rupture had taken place it was probably spontaneous, owing to some disturbance in the uterine wall. There is a possibility that the placenta in some of its parts had probably undergone chorionic epitheliomatous degeneration and had destroyed the uterine musculature of that region. It may have been very limited in extent.

Dr. Charles L. Bonifield, Cincinnati: The woman might have received some injury to the uterus through the abdominal wall which may have caused a limited thrombosis.

Rupture of the Uterus in Cesareanized Women

Dr. John Norval Bell, Detroit: A cesareanized woman is always in danger of uterine rupture in subsequent pregnancies, and should be under careful observation for the last half of her gestation. In case her puerperium following the first section was afebrile, she may be allowed to go to term if she can be in the hospital for the last month of gestation; otherwise the labor should be anticipated and operation done at least two weeks prior to term. Implantation of the placenta over the scar area undoubtedly increases the danger of rupture, as does also a febrile puerperium following operation.

Fibromyoma Uteri and Cardiovascular Disease

Dr. Ben K. McClellan, Xenia, Ohio: I have studied twenty-six cases of fibromyoma uteri, nine of which had well-marked cardiovascular complications. In each case the diagnosis of the latter condition was confirmed by a competent internist. Of the nine, only two gave any history of other adequate cause than the presence of the fibroid uterus; these two gave distinct histories of a previous acute pelvic infection. Two of the nine patients died, one within a few hours following a difficult removal of a very large multiple fibroid of many years' growth, which had undergone cystic degeneration, and was complicated by very extensive adhesions to the surrounding viscera. The heart behaved badly during the operation, and death was undoubtedly due to shock, which in turn was caused by extreme traumatism in the presence of heart and blood vessels already handicapped by changes due to the presence of the chronic uterine disease. The other patient, in whose case there were pronounced cardiac and renal complications, was carefully prepared for the operation, which was not difficult, although the tumor was of extreme size. The patient made an exceptionally good recovery up to the eleventh day, but died without warning, while sleeping after a dinner which she had greatly enjoyed. No doubt the cause of death was brown atrophy of the heart. In neither of these cases could a necropsy be secured, but both physical examination and the clinical history were enough to establish the fact of serious cardiovascular changes. The remaining seven patients have all recovered with symptomatic relief from cardiac trouble, and only three, on careful physical examination, show some hypertrophy.

(*To be continued*)

Current Medical Literature

AMERICAN

Titles marked with an asterisk (*) are abstracted below.

Boston Medical and Surgical Journal

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1 Treatment of Diabetes. F. Fremont-Smith, Washington, D. C.—p. 476.
2 Insufficient Oxygen Supply as Factor in Disease. F. H. McCrudden, Boston.—p. 480.
3 Roentgentherapy in Hypertrophy of Thymus. Report of Cases. P. H. Cook, Worcester.—p. 483.

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4 *Treatment of Neurasthenia. A. F. Riggs, Stockbridge, Mass.—p. 281.
5 *Gastro-Intestinal Findings in Case of Sprue; Treatment Based on These Findings. T. R. Brown, Baltimore.—p. 289.
6 Case of Atrophy of Fatty Layer of Skin, Preceded by Ingestion of Fat by Large Phagocytic Cells—Macrophages. T. C. Gilchrist and L. W. Ketron.—p. 291.
7 *Tetanus Following Gunshot Wounds. J. A. C. Colston, Baltimore.—p. 294.
8 Gas Gangrene—Its Course and Treatment. K. Taylor, Paris.—p. 297.
9 *Prognostic Value of Blood Cultures in Erysipelas. T. P. Sprunt, Baltimore.—p. 300.
10 History of Discovery of Secretory Glands and Their Function. M. Frank, Chicago.—p. 302.

4. **Treatment of Neurasthenia.**—Riggs is convinced that prolonged rest had regularly done his patients more harm than good. In fact, the more rest they had had, the more tired they seemed to have become. On the other hand, those who had had an exercise cure were in much better condition, not only physically, but mentally as well. As to the cause of the condition, Riggs believes that neurasthenia is primarily a mental disorder; that the disorder, in nearly all cases, is originally independent of any and all bodily conditions, and that it exists, in spite of a structurally normal central nervous system. To all intents and purposes, then, the neurasthenic is an organically normal individual. He is sound of mind and body, but this normal apparatus of his gets out of working order because it is unskilfully used and, therefore, gets out of internal adjustment, and also out of adjustment with what should be its work. Were neurasthenia exhaustion, rest would cure it. It does not. Were it an inherent weakness of the organism, not a single case could be cured. Many cases are cured. Were it due to physical disorders, then physical treatment of these disorders would cure it. The conclusion seems clear that neurasthenia is not weakness nor exhaustion; that it is neither a malady of the intestines, the heart, the stomach, nor a disorder dependent on structural change of the nervous system; and that it, therefore, cannot be cured by rest or by any other physical means. It calls for psychotherapy primarily and for physical means only secondarily, and then only to combat the physical byproducts—whatever they may be. Fundamental reeducation of the

patient is the weapon in which Riggs puts his greatest trust. Occupation, both manual and intellectual, is one of the most important instruments of reeducation. A thorough physical examination precedes treatment.

As soon as the patients have acquired a good working modicum of self-control, and their physical condition has become satisfactory with as little warning beforehand as possible they are sent home on a trial trip, to apply their knowledge and the fruits of their practice to their own environment. The stay at home varies from two and three weeks to six months or more in length—according to the case and the environment. A return for treatment usually follows the trial trip. The next home going is apt to be permanent, but is often followed in six months or a year by another and final visit of a few days. Patients discharged two years and over, 129. No improvement, 0.7 per cent.; improved, 15 per cent.; much improved, 36 per cent.; cured, 47 per cent. Patients discharged three years and over, 91. No improvement, 1 per cent.; improved, 11 per cent.; much improved, 30 per cent. and cured, 57 per cent.

5. **Gastro-Intestinal Findings in Case of Sprue.**—The most striking features in Brown's case were, first, the persistence of the complete absence of pancreatic secretions, not only during the stage of apparent illness, but even after the patient felt and seemed absolutely well; second, the essential rôle of the constant administration of pancreatic extract by mouth in the therapy of the disease; third, that whatever the cause of sprue, and at present it seems probable that it is due to an infection with monilia, the lack of pancreatic secretion seems persistent and fundamental, the absence of gastric juice variable and accidental; fourth, that as long as the patient still suffers from this pancreatic achylia she can in no wise be considered as cured, although clinically she is apparently well; and the ultimate outcome must still remain doubtful.

7. **Tetanus Following Gunshot Wounds.**—Colston endorses the use of intraspinal administration of magnesium sulphate in cases of tetanus in which a fatal outcome is to be feared from spasm of the glottis or from exhaustion.

9. **Blood Cultures in Erysipelas.**—Five patients of the thirty-four cited by Sprunt showed a streptococcus bacteremia. Of these, four died. The fifth had very few organisms in the blood, no other demonstrable complication, and recovered after a prolonged febrile course of thirty-two days, the longest of the series. The only other fatality occurred in a case in which a blood culture was not made, but in which metastatic lesions suggest that a demonstrable bacteremia existed. There was no death among the patients whose blood was sterile, though several complications were encountered, namely, suppuration, phlebitis, erysipelas migrans.

Colorado Medicine, Denver

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11 *Abdominal Pain. J. R. Espey, Trinidad.—p. 262.
12 Treatment of Ununited Fractures by Use of Bone Graft. E. F. Dean, Denver.—p. 268.
13 Control of Cancer. F. W. Bancroft, New York.—p. 273.
14 Infantile Hygiene During Preschool Age. K. Lindsay, Boulder. p. 279.
15 Records of Plague. W. H. Crisp, Denver.—p. 282.

11. Abstracted in THE JOURNAL, Sept. 30, p. 1040.

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16 Chancre. E. G. Ballenger and O. F. Elder, Atlanta.—p. 81.
17 So-Called Tertiary Syphilis. W. L. Champion, Atlanta.—p. 84.
18 Pathology of Syphilis. E. C. Thrash, Atlanta.—p. 87.
19 Original Wassermann vs. Noguchi Reaction for Diagnosis of Syphilis. A. H. Bunce, Atlanta.—p. 92.

Journal of Bacteriology, Baltimore

March, I, No. 2

20 *Preliminary Report on Synthetic Media. C. J. T. Doryland, Fargo, N. D.—p. 135.
21 Significance of Voges-Proskauer Reaction. M. Levine, Ames, Iowa.—p. 153.
22 Studies on Soil Protozoa and Their Relation to Bacterial Flora. J. M. Sherman, Madison, Wis.—p. 165.
23 Are Spore-Forming Bacteria of any Significance in Soil Under Normal Conditions? H. J. Conn, Geneva, N. Y.—p. 187.
24 Possible Function of Actinomycetes in Soil. H. J. Conn, Geneva, N. Y.—p. 197.
25 Practical Observations on Titration and Adjustment of Culture Media. B. van H. Anthony and C. V. Ekroth, New York.—p. 209.
26 New Species of Alcohol Forming Bacterium Isolated from Interior of Stalks of Sugar Cane Infested with Cane Borer Distraea

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Saccharalis. W. L. Owen, New Orleans.—p. 235.
27 Studies on Aerobic Spore-Bearing Nonpathogenic Bacteria. W. W. Ford, Baltimore.—p. 273.
28 Spore-Bearing Bacteria in Milk. J. S. Lawrence and W. W. Ford, Baltimore.—p. 277.
29 Number of Colonies Allowable on Satisfactory Agar Plates. R. S. Breed and W. D. Datterrer, Geneva, N. Y.—p. 321.
30 Modification of Hygienic Laboratory Method for Production of Tetanus Toxin. H. L. Wilcox, New York.—p. 333.
31 Method of Anaerobic Plating Permitting Observation of Growth. H. W. Jones, Washington, D. C.—p. 339.
32 *Testicular Infusion Agar. Sterilizable Culture Medium for Gonococcus. I. C. Hall, Los Angeles.—p. 343.

20. **Preliminary Report on Synthetic Media.**—This paper deals both with synthetic nutrient solutions and with solid synthetic media formed by the precipitation of an agglutinant from compounds of known composition and structure. Silica jelly is pronounced by Doryland to be the most suitable solid medium. The method consisted essentially of dissolving chemically pure potassium silicate and chemically pure sodium silicate in water in sufficient amounts to give a concentration of 34.2732 gm. of silicic acid per liter. One half this concentration of silicic acid per liter gives a medium which will solidify in approximately five minutes, thus making a medium suitable for plating. The mixture of sodium and potassium silicate gives us sodium and potassium salts in the final medium instead of only sodium salts, thereby lessening the danger of too great a concentration of sodium salt.

The solid synthetic media were prepared in the following manner: solutions of hydrochloric acid, sulphuric acid and phosphoric acid were each standardized separately, against the sodium silicate and potassium silicate solution, so that 1 c.c. of each acid would just neutralize 1 c.c. of the silicate solution. Whenever an organic acid such as formic, acetic lactic or tannic, etc., was used as a source of energy it was made in sufficient concentration to just neutralize an equal volume of the silicate solution. These acids, that is the hydrochloric acid, sulphuric acid, phosphoric acid, and the organic acid, were then mixed together in such proportion that the resulting salts from the sodium and potassium silicate would be present in the final silicate medium in quantities, approximately, inversely proportional to their osmotic action, thus giving a minimum osmotic pressure. Before standardization the hydrochloric acid there was added to it 0.5 gm. magnesium sulphate, 0.01 gm. calcium carbonate or calcium oxid, 0.01 gm. of ferric sulphate and 0.01 gm. of manganous sulphate per liter. Ammonia nitrogen was added to the hydrochloric acid as ammonium sulphate. Cyanid nitrogen was added to the hydrochloric acid as potassium ferricyanid. Nitrite nitrogen was added to the neutral solution in the Petri dish, nitrate nitrogen was added to the acid mixture as nitric acid. All the sources of nitrogen were added in proportion to give 1 gm. of their respective salts per liter.

When sterile, 5 c.c. of the acid mixture was added to a sterile Petri dish, after which there was added 5 c.c. of the silicate solution. The plate was then rotated to mix the two solutions thoroughly, and then inoculated. If a nonacid compound was used as a source of energy (say glucose) a sufficient amount of a sterile aqueous solution, to give 10 gm. per liter, was added at this point. The resulting silica medium was neutral to phenolphthalein and set firmly in approximately five minutes. The growth of organisms on this solid medium resulted generally in quite typical colonies, although with a few organisms somewhat peculiar developments took place. The liquid media used had a concentration similar to the above with the exception that silicic acid was absent.

32. **Testicular Infusion Agar.**—The formula followed by Hall in preparing testicular infusion agar for the growth of the gonococcus in preparing suitable vaccines is as follows: 1. Mix 500 gm. ground beef testicle from which the tunica vaginalis has first been stripped, with 1,000 c.c. distilled water. 2. Soak overnight at room temperature. 3. Heat to 50 C.

Keep warm for one hour by placing in the incubator at 37 C. 4. Boil, strain and restore to 1,000 c.c. with distilled water. If in excess do not reduce by boiling since overheating is injurious. 5. Add 2 per cent. peptone (Witte's or Difco), 3 per cent. agar chopped fine, 0.5 per cent. glucose, 0.3 per cent. acid sodium phosphate. 6. Soak at least one hour to soften the agar. Melt in the autoclave at 10 pounds pressure for thirty minutes. 8. Titrate with phenolphthalein and add N/1 sodium hydroxid sufficient to neutralize if no unsaturated compounds were present. 9. Check the titer by repetition. Five c.c. should require from 1.0 to 2.0 c.c. N/20 sodium hydroxid to display color hot. 10. Tube and sterilize in the autoclave at 10 pounds for thirty minutes. 11. Slant or pour into plates.

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April, 1, No. 2

33 *Isolated Organ Lipoids as "Antigen" in Wassermann Test. E. S. L'Esperance and A. F. Coca, New York.—p. 129.
34 *Is Hyperleukocytosis Following Injection of Typhoid Bacilli into Immunized Rabbits Specific? H. I. McWilliams, New York. —p. 159.

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35 Effect of Lecithin and Horse Serum on Hemolytic Action of Certain Peptones. A. A. Epstein, New York.—p. 183.
36 Study of Strain of B. Welchii Isolated in France Together with Some Notes on Gastric Ulcers. M. W. Stewart and R. West, New York.—p. 189.
37 Human Sensitization. R. A. Cooke and A. Vander Veer, Jr., New York.—p. 201.
38 *Study of Grouping Meningococcus Strains. M. P. Olmstead, P. L. DuBois, J. B. Neal and R. Schweitzer, New York.—p. 307.
39 *Bacterial Cultures of Human Spleens Removed by Surgical Operation. A. W. Sellards, Boston.—p. 321.

33. Isolated Organ Lipoids as Antigen in Wassermann Test.—With their method of employing the isolated ox-heart lipoids L'Esperance and Coca have obtained a relatively low percentage (compared with the figures of Ritz and Sachs) of positive reactions in individuals denying syphilitic history, and a relatively high percentage of positive reaction in clinically recognized syphilis. Similar differences were observed in the results obtained in parallel tests with the isolated lipoid antigen and the alcoholic extract of guinea-pigs' heart muscle in a series of 706 cases. In 650 of the 706 cases the results of the tests were the same with the two "antigens." In the remaining fifty-six cases different results were obtained. In twenty cases of thoroughly treated syphilis without symptoms, and of other diseases, no inhibition was obtained at either incubation temperature even with 0.2 c.c. of the diluted extract of the guinea-pig's heart. In six cases of untreated secondary and tertiary syphilis complete fixation was obtained at both incubation temperatures with 0.001 c.c. of the diluted extract of the guinea-pig's heart. In all of these cases a similar result was obtained with the ox-heart lipoids. Of twenty-six cases of tuberculosis, malignant tumor was nephritis, all denying syphilitic infection, three cases of tuberculosis reacted positively with as little as 0.02 c.c. of the diluted extract of the guinea-pig's heart, and nine cases of tuberculosis, one case of malignant tumor and the case of nephritis reacted positively with 0.1 c.c. All of these cases were negative with the isolated lipoids. In one case of chancre, and in one of tertiary ulceration, the reaction was distinctly positive with the isolated lipoids but it was completely negative with even 0.1 c.c. of the diluted extract of the guinea-pig's heart. In another case of primary syphilitic lesion the reaction with the isolated lipoids was strong but with 0.05 c.c. of the extract of the guinea-pig's heart it was weak.

34. Hyperleukocytosis.—Throughout all of McWilliams' experiments the results point to a leukocytic reaction of nonspecificity. Both normal and typhoid immune rabbits respond with a well marked leukocytosis to the intravenous injection of typhoid bacilli, but the response is not different in degree in the two instances. Typhoid immune rabbits show the same grade of hyperleukocytosis when injected with *B. coli* as when injected with *B. typhosus.* The same is true of rabbits immunized against *B. coli.* These results were obtained with killed and living vaccine, with an old laboratory strain of typhoid and a freshly isolated one, and with typhoid bacilli grown on plain nutrient agar and on rabbit blood agar. Hence no evidence has been observed in favor of the view that typhoid immune rabbits exhibit a specific hyperleukocytosis following the injection of vaccine.

38. Grouping of Meningococcus Strains.—By means of complement fixation the authors claim that the meningococcus may be differentiated from allied organisms. A differentiation of individual meningococcus strains is possible by the use of refined technic but the relationship of strains is so close that it is difficult to obtain absolutely clear cut and consistent results. Of the twenty-nine strains studied by the authors, fourteen seem to form one group and eight a second group. Three seem to be closely related to the first group but have acted so irregularly that they cannot be classed with it, two have shown a relationship with each other only and two have shown a relationship to no other strain.

39. Bacterial Cultures of Human Spleens.—Bacterial cultures were made by Sellards of human spleens removed for surgical purposes in ten cases. The cultures from four of these spleens remained sterile. In three instances, a micrococcus was obtained and in three other cases an anaerobic bacillus developed. The anaerobic bacillus in its morphology, in its cultural characteristics and in its serologic reactions resembled very closely the bacillus isolated by Plotz in typhus. The evidence which is at present available indicates that these anaerobic bacilli, isolated by Plotz from typhus and appearing also in cases of pernicious anemia, constitute essentially a single species. Sellards believes that the weight of evidence indicates that this group of organisms represents parasitic but nonpathogenic flora of the human body. There is not sufficient evidence to ascribe a specific etiologic rôle to members of this group of anaerobic bacilli in either typhus or in pernicious anemia.

Journal-Lancet, Minneapolis

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40 State and Medical Education. G. D. Head, Minneapolis.—p. 557.
41 Campaign for Conservation of Senses. J. H. Rindlaub, Fargo, N. D.—p. 561.
42 Puerperal Eclampsia; Report of Cases. O. R. Wright, Huron, S. D.—p. 567.

Kentucky Medical Journal, Bowling Green

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43 Lessons and Observations of Medicolegal Committee. J. J. Moren, Louisville.—p. 527.
44 Physician Considered as Business Man. G. Cowan, Danville.—p. 533.
45 Why Medical Society? L. D. Hammond, Irvin's Store.—p. 534.
46 Local Anesthesia. W. I. Hume, Louisville.—p. 536.
47 Emergency Cases Seen in Eye and Ear Practice. A. O. Pfingst, Louisville.—p. 538.
48 Gallbladder Surgery. J. R. Wathen, Louisville.—p. 541.
49 Symptomless Hematuria. H. J. McKenna, Louisville.—p. 543.
50 Eclampsia of Pregnancy. J. T. Reddick, Paducah.—p. 546.
51 Gastro-Intestinal Catarrh. R. Dade, Oak Grove.—p. 549.

Medical Record, New York

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52 Problem of Rest or Exercise in Treatment of Pulmonary Tuberculosis; Plea for Less Ergophobia. C. L. Minor, Asheville, N. C. —p. 617.
53 Histopathologic Changes in Five Cases of Myelitis. G. B. Hassin, Chicago.—p. 619.
54 Brain-Tumor or Hysteria; Report of Case. J. V. Haberman, New York.—p. 624.
55 Review of History of Chemical Therapy in Cancer. W. S. Stone, New York.—p. 628.
56 Cystoscopy as Diagnostic Aid in Spinal Cord Diseases. G. Greenberg, New York.—p. 634.
57 Case of Thrombophlebitis in Tuberculous, with Necropsy. E. A. Gray, Chicago.—p. 636.
58 Case of Pan-Sinusitis, Complicated with Acute Suppurative Appendicitis and Acute Mastoiditis. J. E. Sheehan, New York. —p. 637.

Michigan State Medical Society Journal, Grand Rapids

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59 Papal Physicians. F. X. Barth, Escanaba.—p. 469.
60 Methods in Diagnosis of Surgical Diseases of Abdomen. J. A. MacMillan, Detroit.—p. 476.
61 Labyrinthitis — Report of Cases in Acute Suppurative Otitis Media and After Operations. D. M. Campbell, Detroit.—p. 481.
62 Case of Abductor Paralysis with Removal of One Vocal Cord. C. H. Baker, Bay City.—p. 485.
63 Poliomyelitis Situation in Detroit. G. Sewell, Detroit.—p. 487.

64 Service De Sante, French Army, or Care of French Wounded. L. C. Donnelly.—p. 490.
65 Case of Hydrocephalus with Spinabifida and Complete Situs Inversus. L. L. Bottsford, Ann Arbor.—p. 492.
66 *Coley's Mixed Toxins in Four Cases of Osteosarcomas. H. de B. Barss, Ann Arbor.—p. 497.
67 Eight Years in Department of Internal Medicine. A. W. Hewlett, Ann Arbor.—p. 505.
68 Case of Lupus Vulgaris. U. J. Wile, Ann Arbor.—p. 508.

66. **Coley's Mixed Toxins in Sarcoma.**—Barss urges the use of Coley's mixed toxins. One patient with sarcoma of the antrum, patently inoperable, who had been given a course of Roentgen-ray treatments without improvement by a man who is acknowledged to be an expert in his line, is now well for over twenty months. Another patient with sarcoma of the head of the humerus, also clinically inoperable, is well a year later, apparently cured and still possessed of his arm. In the third case, the growth of the tumor in the internal condyle of the femur was delayed, the health of the patient was greatly improved and the subsequent operation was unusually well borne. In the fourth case, sarcoma of tibia, the patient is in good health more than a year later with no evidence of metastases. Unfortunately there is now distinct evidence of a local recurrence. But the general health of the patient is much improved, and if a second operation or if amputation even is indicated later, the chances for a much more favorable and permanent result have been increased.

Missouri State Medical Association Journal, St. Louis

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69 Anesthesia by Selection. H. C. Andersson, Kansas City.—p. 477.
70 *Transitory Cardiac Dilatation from Overstrain. E. P. Buddy, St. Louis.—p. 482.
71 *Diagnostic Value of Respiration Tracings (Pneumograms). G. Richter, St. Louis.—p. 486.
72 Tuberculosis and Abortion. G. C. Mosher, Kansas City.—p. 489.
73 Dysmenorrhea. G. D. Royston, St. Louis.—p. 495.
74 Bothriocephalus Latus Infection in Missouri; Report of Case. J. C. Kopelowitz, St. Louis.—p. 502.
75 *Interesting Findings as Regards Clothing Patient Wears when Roentgen-Rayed. J. S. Young, St. Louis.—p. 502.
76 Fakes and Efficiency in Medical Profession. C. S. Nelson, Harrisonville.—p. 504.

70 and 71. Abstracted in THE JOURNAL, June 24, p. 2119.

75. **Interesting Findings as Regards Clothing Patient Wears when Roentgen Rayed.**—Because silk is quite impervious to the Roentgen ray, Young urges that we be very careful to ask the patient about his or her clothing before giving an opinion on obscure shadows which are seen in very thin plates. He says that 1 mm. of silk will filter out as much short or soft rays as 1 mm. of aluminum as he showed to be the case by experiments. He has come to the conclusion that a glove can be made of silk, which may be heavily impregnated with lead, and owing to its weight and thickness one can, in a measure, feel what he is doing in an abdominal palpation. Silks may be graded by the use of the fluoroscope. Young has a thousand pieces of silk graded 0, 1, 2, 3, according to the amount of resistance they offer to the rays or the density of the shadows cast on a plate with a mild exposure, say about one-half X-unit, or what would be termed a one-half therapeutic dose to the skin. There are many varieties of silks. All resist the rays more than ordinary woolen or cotton cloth, but the cheaper silks seem to be more impervious to the rays, for the simple reason that they are weighted with different metals, and consequently the cheaper variety contains more of the metal than the higher qualities.

Modern Hospital, St. Louis

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77 Hospital and Surgeon. S. S. Goldwater, New York.—p. 273. To be continued.
78 Metropolitan Life Insurance Company Tuberculosis Sanatorium. H. J. Howk and D. E. Waid, New York.—p. 278.
79 Owner, Architect and Engineer. O. E. Goldschmidt, New York. —p. 288.
80 New Bethany Hospital, Kansas City, Kan. J. M. Moulder, Kansas City, Kan.—p. 292.
81 Small Community Hospital—Constructing Building. J. A. Hornsby, Chicago.—p. 295.
82 Where Welfare of Employees Is Considered of Great Importance. M. C. Turpin, Pittsburgh.—p. 300.
83 Modern Hospital as Health Factory. F. D. Keppel, Cazenovia, N. Y.—p. 303.
84 Contagious Building, Memorial Hospital, New London, Conn. N. R. Burby, New London, Conn.—p. 306.
85 Disinfection and Other Practicable Methods of Preventing Spread of Infection in Hospitals. R. J. Wilson, New York.—p. 316.
86 Hospital's Obligation to Every Patient Who Enters Institution. J. T. Bottomley, Boston.—p. 319.

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87 Hay Fever in Louisiana. W. Scheppegrell, New Orleans.—p. 254.
88 Epidural, Caudal or Sacral Anesthesia. C. W. Allen, New Orleans. —p. 258.
89 Surgical Aspects of Infantile Paralysis. E. D. Fenner, New Orleans.—p. 284.
90 Treatment of Pneumonia with Phylacogen. J. B. Anderson, Yazoo City, Miss.—p. 291.
91 Occurrence in United States of Certain Nematodes of Ruminants Transmissible to Man. B. H. Ransom, Washington, D. C.—p. 294.
92 Studies on Trichomonas. N. Barlow, St. Louis.—p. 299.
93 Case of Diarrhea Apparently Due to Flagellate Parasites. J. B. Elliott, Jr., New Orleans.—p. 308.
94 Bilateral Distribution of Lesions in Leprosy in Relation to Bacteremic Nature of Disease. D. Rivas, Philadelphia.—p. 311.

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95 Therapeutics of Hay Fever. A. P. Hitchens, Glenolden, Pa.—p. 673.
96 Acute Intussusception in Infants. B. T. Tilton, New York.—p. 681.
97 Roentgen Ray Therapy. A. J. Quimby and W. A. Quimby, New York.—p. 682.
98 Occupational Thecitis. A. Cohn, Philadelphia.—p. 685.
99 Psychology of Faddist. B. S. Talmey, New York.—p. 686.
100 Iritis and General Practitioner. W. L. Rhodes, Kansas City, Kan. —p. 690.
101 Labyrinthine Inflammation. C. B. Broder, New York.—p. 691.
102 Epileptic Syndrome and Glandular Therapy. J. L. Joughin, New York.—p. 693.
103 Chronic Gonorrhea. W. S. Barnes, New Haven, Conn.—p. 695.
104 Verify Your References. F. Place, Jr., New York.—p. 697.

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105 Indications and Methods for Cesarean Section. E. E. Rice, Shawnee.—p. 313.
106 Extra-Uterine Pregnancy. M. Rogers, Clinton.—p. 318.
107 Indications and Use of Forceps in Obstetrics. J. M. Bonham, Hobart.—p. 322.
108 Twelve-Hundred and Thirty-Six Consecutive Operated Cases of Appendicitis. A. L. Blesh, Oklahoma City.—p. 324.
109 So-Called* Chronic Appendicitis, Which is Located in Cecum. F. A. Hudson, Enid.—p. 330.
110 Medical Inspection of Schools. G. A. Morrison, Poteau.—p. 331.
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115 Disinfection. J. K. McLeod, Sydney, N. S.—p. 415.
116 Cerebrospinal Fever, from Standpoint of Epidemiology. A. G. Nicholls, Halifax.—p. 417.

Surgery, Gynecology and Obstetrics, Chicago

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117 Cystitis Senilis Feminarum; Report of Cases. F. R. Charlton, Indianapolis.—p. 371.
118 Spontaneous Exclusion of Kidney from Calculi. C. M. Harpster, Toledo, Ohio.—p. 375.
119 *Diverticula of Urinary Bladder. G. J. Thomas, Rochester, Minn. —p. 378.
120 *Treatment of Genital Tuberculosis in Male. J. H. Cunningham, Jr., Boston.—p. 385.
121 Treatment of Fatty Capsule and Ureter in Nephrectomy for Renal Tuberculosis. H. L. Kretschmer, Chicago.—p. 391.
122 Clinical and Pathologic Evidences of Possibilities of Spontaneous Healing of Renal Tuberculosis without Total Destruction of Kidney. E. L. Young, Jr., Boston.—p. 395.
123 One Hundred and Thirty-Three Cases of Gallbladder Surgery with Especial Reference to Postoperative Treatment. R. L. Rhodes, Augusta, Ga.—p. 399.
124 Preliminary Hemostasis in Goiter Operations. F. de Quervain, Basel, Switzerland.—p. 402.
125 *Relation of Arteriosclerosis and Other Anatomic Changes of Old Age to Development of Epithelial Malignancy. F. Warner, Columbus.—p. 413.
126 Rupture of Gallbladder; Report of Case. W. W. Grant, Denver. —p. 422.

127 Cases of Puerperal Gangrene of Extremities. A. Stein, New York. —p. 424.
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131 *Diaphragmatic Hernia; Report of Case. O. J. Seibert, Cincinnati. —p. 465.
132 Carcinomatous Degeneration of Sebaceous Cysts. I. Seff and S. Berkowitz, New York.—p. 469.
133 Follicular Odontomata of Superior Maxilla. C. W. Waldron, Toronto, Canada.—p. 473.
134 Operation for Correction of Deformity Following Chopart's Amputation of Foot. J. F. Smith, Wausau, Wis.—p. 476.
135 Treatment of Fractures by Nail Extension. F. G. Dyas, Chicago. p. 478.
136 Continual Stomach Lavage and Continuous Hypodermoclysis in Peritonitis Persistent Vomiting with Dehydration and Dilated Stomach. A. B. Kanavel, Chicago.—p. 483.
137 Use of Electric Light and Hypochlorous Acid in Treatment of Wounds. G. W. Crile, Cleveland.—p. 486.
138 Application of Sewing Machine Stitch in Gastric and Intestinal Anastomoses. E. P. Quain, Bismarck, N. D.—p. 489.
139 Detachable Appliance for Conversion of Operating Cystoscope into Double Catheterizing Instrument. P. S. Pelouze, Philadelphia. —p. 490.

119. **Diverticula of Urinary Bladder.**—From January, 1903, to November, 1915, twenty-seven cases of diverticulum of the bladder had been observed in the Mayo Clinic. Fourteen of these patients were operated on; seven were not operated on, and six cases were found at necropsy. The average age of these patients was 51 plus years; the youngest 18, and the oldest 73. The average age at onset of symptoms was 43 plus years. Other than these, numerous cases were observed which were regarded as false diverticula, probably the result of mechanical obstruction or inflammatory changes. Previous disease: Of these twenty-seven patients, six gave a history of urethral infection and two had infection about the urethra associated with stricture. Five patients had had previous operations, two for prostatic obstruction, and three some operation on the bladder for drainage or exploration. Six had trauma of the bladder, suprapubic area, or of the perineum. The trauma to the perineum in two cases was the cause of obstruction which preceded the symptoms. The four remaining patients gave good histories of onset of symptoms immediately following the trauma of the bladder.

Difficulty of urination was present in nineteen instances and was noted in eleven as the first symptom. In nine there was retention and catheterization had to be resorted to before urine could be passed. In three there was incontinence. Frequency was a first symptom in nine and was the predominate symptom in twenty-two. Hematuria was the first sign observed by the patient in two instances while macroscopic blood was observed at some time during the history in eight. In two patients the symptoms began in childhood. A suprapubic tumor was palpable in three cases; in none was a flank or rectal mass observed. In eleven cases a noticeable loss in weight was reported and this seemed to be the most common clinical finding. In six the general loss of strength was graded as three on a scale of four. The opening of the diverticulum was found near the meati in six of the twenty-seven patients, on the right side in two, and on the left in four. In six others the opening was found on the floor of the bladder; in two near the urethra; in four on the posterior wall; in two in the dome; in three the lateral walls were involved; in one an hour-glass condition was found. In the three remaining cases the opening was on the posterior wall or base. In four cases there was more than one diverticulum. In thirteen cases generalized trabeculation of the bladder was present.

In fourteen cases some type of operation was performed. In six the diverticulum was resected. The extraperitoneal operation was done four times and the intraperitoneal two. A preliminary drainage was done in two cases preparatory to a resection. In six instances a drainage operation only was done or the diverticular opening was enlarged. In one case a septum was removed and in one a diverticulum was dissected loose and its opening enlarged so that the drainage was improved or complete. In three instances cancers were removed; stones were removed in three patients, two having stones in the diverticula. It was necessary to remove the prostate in six instances. Dilatation of the ureter was found in one. In only one case was there evidence of perforation or of peritonitis. Evidence of peridiverticulitis with resultant adhesions was present in every patient.

120. **Treatment of Genital Tuberculosis in Male.**—Postmortem and clinical findings show that the great majority of cases of genital tuberculosis have active tuberculosis elsewhere in the body, the infection in the genito-urinary tuberculosis being a secondary infection. The majority of cases of tubercular epididymitis have tuberculosis of the vesicles and prostate on the corresponding side, whether the condition can be demonstrable by physical examination or not. Cases of genital tuberculosis often have associated tuberculosis of the bladder and kidney, and a cystoscopic examination with catheterization of the ureter should be a routine procedure, in each case, before the possibility of such associated infection can be eliminated. In Cunningham's opinion the best treatment for the local condition, in most instances, is to remove the scrotal focus by epididymectomy or castration, and this should be followed by injecting the vas with a drachm of crude phenol, with the hope of eradicating the disease from the genital tract. The destruction of the local focus by this procedure is but the first step in the process of immunizing the patient against fresh outbreaks of the disease; and that hygiene and tuberculin should be made use of indefinitely, as they serve further to aid, in a rational way, the immunizing power of the body against remaining lesions.

125. **Relation of Arteriosclerosis to Epithelial Malignancy.**—Of 206 cases of carcinoma of all organs and regions examined by Warner, 105 showed arterial obstructive changes. Fibrotic changes were present in 118 cases, 57 per cent. Lymphocytic infiltration was present in eighty-five cases, 57 per cent. That endarteritis and the anatomic changes of old age cannot be looked on as a constant factor in the production of cancer is shown by the fact that normal vessels were present in almost half the cases. The same holds true of fibrosis or even acellular connective tissue without fibrosis. Lymphocytic infiltration, while present in less than half of the cases, plays a rôle that is protective rather than etiologic. Warner suggests that certain biochemical factors of a local or internal and general type are probably responsible for some cases of cancer.

131. **Diaphragmatic Hernia.**—In Seibert's case the stomach had herniated through an enlarged esophageal opening. The entire stomach was found in the posterior mediastinum, directly behind the heart. Dense fibrous bands of adhesions were holding the pylorus directly to the margin of the ring. These bands were so dense and firm that they had to be cut. After this was done the stomach could readily be pulled through into the abdomen.

Texas State Journal of Medicine, Fort Worth

October, XII, No. 6

140 Provision for Medical Care Under Health Insurance. A. Lambert, New York.—p. 249.
141 Male Climacteric. J. S. Turner, Dallas.—p. 251.
142 Differential Diagnosis and Treatment of Convulsions in Infancy. C. G. Grulee, Chicago.—p. 254.
143 Bacteriology of Operating Room Air and Its Possible Relation to Wound Infection. W. L. Brown and C. P. Brown, El Paso.—p. 256.
144 Handling of Eye Cases in Railroad Practice. J. L. Scales, Shreveport, La.—p. 259.
145 Congenital Umbilical Hernia; Report of Cases. E. G. Mathis, Austin.—p. 261.
146 Does Administration of Pituitary Extract to Mother Produce Diffuse Nervous Lesions in Infant? A. G. Heard, Galveston.—p. 264.
147 Report of Dermatologic Cases. J. B. Shelmire, Dallas.—p. 267.
148 Lung Inflator and Aspirator for Resuscitation of Newborn. E. A. Cayo, Beeville.—p. 269.

West Virginia Medical Journal, Huntington

October, XI, No. 4

149 Some Experiences with Fractures and Conclusions Drawn. C. S. Hoffman, Keyser.—p. 113.
150 Tetanus, with Special Reference to Treatment with Antitetanic Serum; Report of Cases. W. J. Judy, Belleville.—p. 115.
151 Essential Purpose of Hospital. C. Wingerter, Wheeling.—p. 119.
152 Backache Among Railway Employes. W. E. Vest, Huntington.—p. 121.

FOREIGN

Titles marked with an asterisk (*) are abstracted below. Single case reports and trials of new drugs are usually omitted.

Archives of Radiology and Electrotherapy, London

September, XXI, No. 4

1 Renal Calculi in Rudimentary Kidney. F. Lemon.—p. 107.
2 Roentgenography of Gallbladder. N. Macleod.—p. 117.

Bristol Medico-Chirurgical Journal

July, XXXIV, No. 130

3 Reduction of Disabilities from Wounds in War. W. Gordon.—p. 1.
4 Work of Military General Hospital in Egypt. E. H. Groves.—p. 11.
5 Technic of Sphenoidal Sinus Exploration for Meningococcal and Other Infections. P. Watson-Williams.—p. 21.
6 Experiences of Ear, Nose and Throat Specialist at One of Bases. J. P. I. Harty.—p. 39.
7 Some Neuroses of War. J. M. Clarke.—p. 49.
8 Enteric Group of Diseases as Seen in Isolation Hospital in France. J. M. Fortescue-Brickdale.—p. 72.
9 Forensic Examination of Blood Stains in Tropics. F. S. Smith.—p. 82.

British Medical Journal, London

September 16, II, No. 2907

10 Gas Gangrene as Seen at Casualty Clearing Stations. C. Wallace.—p. 381.
11 *Direct Transfusion of Blood. A. Primrose and E. S. Ryerson.—p. 384.
12 Trench Fever: Field Vole Possible Origin. W. J. Rutherfurd.—p. 386.
13 *Case of Ulcerating Granuloma Successfully Treated by Intravenous Injections of Antimony. G. C. Low and H. B. Newham.—p. 387.
14 Lamblia Infections in Men Who Have Never Been Out of England. A. M. Smith and J. R. Matthews.—p. 389.
15 *Case of Intra-Uterine Scarlet Fever. R. M. Liddell and C. E. Tangye.—p. 389

September 23, No. 2908

16 Weil's Disease (Spirochaetosis Icterohemorrhagica) As It Has Occurred in British Army in Flanders. A. Stokes and J. A. Ryle.—p. 413.
17 Heart Affections in Soldiers. J. C. Meakins and others.—p. 418.
18 An Antenatal or Pregnancy Clinic at Edinburgh Royal Maternity Hospital. J. W. Ballantyne.—p. 420.
19 Some Principles of Investigation in Blood Pressure Problems in Health and Disease. J. M. McQueen.—p. 421.
20 Septic Endocarditis; Intravenous Injection of Eusol; Recovery. J. A. Powell.—p. 422.

11. Direct Transfusion of Blood.—Cases illustrating the beneficial effect of the direct transfusion of human blood in hemorrhage are cited by Primrose and Ryerson. No harm resulted to the donors from the withdrawal of seemingly large quantities (815:1,000 c.c.) of blood. They complained of little or no discomfort, and were able to return to duty after a brief interval.

13. Ulcerating Granuloma Treated by Injections of Antimony.—Fifty-three and one-half grains of antimonium tartaratum in from 1 to 2½ grains doses were injected intravenously by Low and Newham during a period of three and one-half months at four-day intervals. As a result of the injections the course and progress of the disease were arrested.

15. Intra-Uterine Scarlet Fever.—During a recent small village outbreak of scarlet fever, a case of rather unusual interest was observed by Liddell and Tangye. Four of five children developed scarlet fever and were removed to the isolation hospital on May 26. The mother was expecting to be confined at any time, and was therefore warned to keep away from the children as soon as the first suspicion arose as to the nature of their illness. Her child was born June 6, and after a thorough washing, which removed all traces of lanugo, was found to be desquamating freely over the whole of the trunk and limbs. The desquamation continued for several days, and the urine showed distinct traces of albumin. Apart from these two features, the child appeared perfectly healthy and is now quite normal. The mother had been rather unwell during the last week or so of her pregnancy, and complained of a "burning pain inside." She had no sore throat or rash, and her temperature was normal. She is positive that she had a severe attack of scarlet fever when about 10 years old, and describes the desquamating stage vividly.

Dublin Journal of Medical Science

September, CXLII, No. 537

21 Fractures and Fracture Dislocations. J. S. McArdle.—p. 145.
22 Acute Appendicitis with Peritonitis; Their Relation and Treatment. J. W. Long.—p. 148.
23 Diagnosis in Uveitis. E. Maxwell.—p. 158.

Glasgow Medical Journal

July, LXXXVI, No. 1

24 *Case of Congenital Heart Disease—Patent Foramen Ovale—Patent Interventricular Septum. L. Findlay and W. B. M. Martin.—p. 1. To be continued.
25 *Experimental Study of Extirpation and Transplantation of Thymus. J. M. Renton.—p. 14.
26 Etiology and Treatment of Gastric Ulcer. H. Morton.—p. 23.

August, No. 2

27 Case of Hernia into Paraduodenal Fossa. J. H. Pringle.—p. 65.
28 Disease and Domesticity. J. Craig.—p. 73.
29 *Cases of Congenital Heart Disease. L. Findlay and W. B. M. Martin.—p. 84. To be continued.

September, No. 3

30 *Ulceration of Small Intestine with Formation of Indol Derivatives and Indigo-Uria. D. R. Adams.—p. 129.
31 *Case of Ectopic Pregnancy which Had Gone Beyond Full Time. R. Jardine.—p. 137.
32 *Cases of Congenital Heart Disease. L. Findlay and W. B. M. Martin.—p. 140.

24. Congenital Heart Disease.—In the case of patent foramen ovale reported by Findlay and Martin the following conditions were found at necropsy: hypoplasia of eyes with corneal opacity, coloboma and congenital cataract, ventral hernia, fetal lobulation of spleen and kidneys, patent foramen ovale, catarrhal bronchitis with early pneumococcic bronchopneumonia, much collapse of lung and slight compensatory emphysema, and venous congestion of organs. In the case of patent interventricular septum the necropsy disclosed a defect of interventricular septum at pars membranacea, with normal great arterial trunks, closed foramen ovale and obliterated ductus arteriosus. Partial collapse of lungs, with terminal very early streptococcal bronchopneumonia.

25. Transplantation of Thymus.—In transplantations of thymus from one guinea-pig to another Renton found healthy thymus tissue up to fifty-three days after transplantation. The thymus was rapidly absorbed when transplanted to the peritoneum (abdomen and tunica vaginalis) or under the skin, but grew in the subperitoneal tissue. No symptoms were caused by transplantation of the thymus. It was impossible to determine if the thymus transplant functionated even when it grew well. Total removal of the thymus did not cause apparent symptoms in young guinea-pigs and rabbits.

29. Congenital Heart Disease.—The first case was one of congenital stenosis of pulmonary tract with atresia of orifice—incomplete interventricular septum, patent ductus artriosus and patent foramen ovale. Extensive pneumococcic bronchopneumonia—venous congestion of organs. Death occurred at the age of 3 months. The second case was one of congenital stenosis of pulmonary tract, with defect of intraventricular septum at pars membranacea, widely patent foramen ovale and duplication of vena cava superior. Partial atelectasis with emphysema and marked congestion of the lungs. Death occurred at the age of 2 months.

30. Ulceration of Small Intestine.—The main points in Adams' case were: death was due to peritonitis and perforation of the ileum following on multiple ulceration of the greater part of the small intestine. This ulceration process had been going on for at least a week before death. The liver activities were to some extent in abeyance. The ulcers of the small intestine were associated with marked invasion of the alimentary tissue by an organism similar to the *Bacillus coli* which, as is well known, can produce indol from proteid and its derivatives. At one stage complete oxidation of the amino-acids into indigo and skatoxyl pigments took place in the body, causing indigo-uria. At a later stage this oxidation was less complete, and indican appeared in the urine.

31. Ectopic Pregnancy.—When full time was supposed to have been reached in Jardine's case, labor pains came in with a slight discharge of blood, but they ceased on the expulsion of a mass which the attendant pronounced to be a bit of placenta. One month later Jardine examined the patient

under an anesthetic. The top of the tumor was close up to the diaphragm. The fetal parts could be palpated, the head being felt high up. There were no fetal heart sounds and no movements, although the patient had stated that she felt movements on the day of admission. The nonpregnant uterus was pushed to the left side. It was enlarged, and the cervical canal would admit a finger. The cavity was empty, but through the right side pressing it inward a mass could be felt which was evidently the breech of the fetus. The diagnosis was an extra-uterine gestation which had gone beyond full time, and the fetus was dead. Jardine made a central incision fairly high up and cut through the outer layer of the sac, but not through the amnion. The sac was everywhere adherent to the parietal peritoneum and the bowels. The child was turned out of the abdomen, and as it came out the amnion ruptured, and some turbid liquor amnii escaped on to the table. The placenta, which was in the lower part of the abdomen, was easily lifted out. It looked like a flattened out mass of gingerbread. There was no bleeding from the site. Recovery was uninterrupted. The child had apparently reached full time. It was beginning to macerate, so it probably had perished about the time of the spurious labor.

32. **Congenital Heart Disease.**—In this case the necropsy disclosed congenital syphilis, patent foramen ovale and patent ductus arteriosus and venous congestion of organs. The child was 1 month old at the time of death.

Journal of Laryngology, Rhinology and Otology, London

September, XXXI, No. 9

33 Centrally Caused Bilateral Laryngeal Abductor Paralysis in Tabes; Report of Postmortem Examination. E. D. D. Davis.—p. 361.
34 Epidemic Nasal Sinus Disease. J. J. Kyle.—p. 367.
35 War Deafness from Lesion of Internal Ear. Got.—p. 374.
36 Two Cases of Referred Sensation (Arnold's Branch of Vagus Nerve). T. A. MacGibbon.—p. 380.

Lancet, London

September 16, II, No. 4855

37 How Septic War Wounds Should Be Treated. A. E. Wright.—p. 503.
38 *Differential Leukocyte Counts in Enteric and Dysenteric Convalescents. I. W. Hall and D. C. Adam.—p. 514.
39 Vaccination of Guinea-Pigs with Bacillus Perfringens. M. Robertson.—p. 516.
40 Infective Jaundice (Spirochaetosis Icterohemorrhagica). N. B. Gwyn and J. J. Ower.—p. 518.
41 *Pneumococcal Meningitis with Recovery Following Vaccine Therapy. A. C. Brown.—p. 519.
42 Crossed Hip Reflex in Enteric Fever. E. B. Gunson.—p. 520.
43 Case of Threadworms in Appendix Simulating Acute Appendicitis. S. G. Papadopoulos.—p. 521.
44 Case of Ruptured Ileum and Bladder; Operation; Recovery. C. P. G. Wakeley.—p. 521.
45 Ground Level Latrine. F. E. Fremantle.—p. 530.

September 23, No. 4856

46 *Cerebral Embolism Consequent on Gunshot Injury to Carotid Arteries. G. H. Makins.—p. 543.
47 *Agglutination Reactions with Oxford Standard Agglutinable Cultures. R. Donaldson and B. Clark.—p. 546.
48 Application of Drop Measuring to Widal Technic. E. W. A. Walker.—p. 552.
49 New Remedy for Syphilis, Luargol or "102." N. S. Bonard.—p. 554.
50 Use of Perforated Celluloid in Dressing of Certain Wounds. S. R. Douglas.—p. 558.
51 Case of Foreign Body in Rectum. J. F. Peart.—p. 558.
52 *Ligature of Right Internal Iliac Artery for Secondary Hemorrhage from Buttock. R. L. Scott and A. R. McLachlan.—p. 559.

38. **Leukocyte Counts in Enteric and Dysenteric Convalescents.**—The blood films from convalescent cases of amebic and bacillary dysentery, typhoid and paratyphoid were examined by Hall and Adam. The figures yielded by seventy-one successive cases of men whose blood contained typhoid agglutinin only, and who had not manifested any enteric symptoms, were within normal limits. In the paratyphoid A convalescents the counts from men who had returned from the Mediterranean area were different from those received from French sources. The former show a larger percentage of polynuclears and a smaller lymphocyte content. In paratyphoid B there was hardly any difference. In posttyphoid conditions, however, there was persistence of low polynuclear and high mononuclear content, long after the pyrexia and acute conditions had subsided. This feature stands out in strong contrast with the differential count of the typhoid inoculated men. The content of agglutinin in antityphoid inoculated men does not appear to influence appreciably the polynuclear or the lymphocyte proportions. Neither does it affect the differential percentages in the paratyphoid A and B convalescents, although in those from the adjacent war zone there is the suggestion of a tendency toward the normal status of the polynuclears and mononuclears in the paratyphoid A cases. The mixed infection of entameba histolytica and paratyphoid B fever appears to be associated with a decreased eosinophilia and a comparatively normal cell count otherwise. In jaundice and frost bite, in which evidence of protozoa or paratyphoidal bacilli was not forthcoming, there is a distinct polynuclear leukocytosis. In heavy lamblia infections eosinophilia is not a definite feature, and the cell counts are within average limits. After the sixth week the counts made on the typhoid films show that the relative mononuclear increase and the polynuclear decrease persist for a considerable period; the same applies to the cases of paratyphoid A from the near war area. The paratyphoid cases from the distant war zone exhibit what are practically normal figures.

41. **Pneumococcal Meningitis.**—The symptoms in the case reported by Brown were those of cerebrospinal meningitis. Lumbar puncture was performed and a rather thick, opaque fluid was withdrawn with difficulty. The pressure was not increased. He was then given, into the abdominal wall, an injection of antimeningococcal serum and the fluid was sent for bacteriologic examination. Until the bacteriologic report was available treatment was symptomatic and consisted largely of frequent doses of hyoscin. When it was known that the cerebrospinal fluid contained not meningococci but pneumococci, vaccine therapy was commenced. Lumbar puncture was again carried out and once more seemed to cause some lessening of extreme restlessness. The reaction to the first dose of vaccine was marked. He became less rigid and more sensible and his headache was less. There was a fall of temperature after each injection. At first the fall was temporary, but after the third injection he seemed, although still very ill, to be definitely on the mend and only two other injections were given. He made a complete recovery.

46. **Embolism and Gunshot Injury to Carotid Arteries.**—The group of fourteen cases cited by Makins consists of a series of injuries to the great vessels of the neck. They illustrate the whole subject and offer special interest from the fact that embolic obstruction of even minor cerebral vessels may produce more serious effects and is more readily recognized than the blocking of vessels supplying small areas of the limb where arterial anastomosis is freer and where degeneration of the tissues concerned is less important in its effects. The presence of a definite perforating wound of the artery has been assumed from the existence of obvious signs. Thus, a systolic arterial bruit, an arteriovenous murmur and purring thrill, the detection of a pulsating swelling in the course of the vessel, or the occurrence of secondary hemorrhage demanding surgical intervention. In one instance also the locality of the injury and the probability of an obliterated opening was indicated by a small circumscribed induration in the course of the vessel. A nonpenetrating injury has been assumed when none of the above signs could be detected, while diminution or abolition of the carotid or superficial temporal pulses has been regarded as evidence of obstruction or complete obliteration of the arterial lumen.

47. **Agglutination Reactions.**—This paper is based on the serum reactions of 275 patients, of whom 184 were soldiers. The tests were carried out on the principle recommended by Dreyer and his colleagues. Donaldson and Clark used a volumetric method, delivering the fluids from accurately graduated pipets. The great majority of the cases arrived with a diagnosis of "enteric," whereas out of 115 cases only 13 per cent. at the outside could be claimed as true typhoid. The mortality among these typhoid cases was nil, and offers a marked contrast to the 15 per cent. mortality among 53 uninoculated civilians. Out of the 115 cases examined twice, 71.6 per cent. contained agglutinins for paratyphoid bacilli,

and out of the whole number of military cases 111, or 60.3 per cent., agglutinated paratyphoid organisms. Paratyphoid infections raise the T. (typhoid) titer in inoculated persons. The authors emphasize the need for repeated agglutinations at intervals in the case at least of persons previously inoculated. They do not think that any diagnostic inference can be drawn from a consideration of the titer in inoculated persons, in cases in which only one examination has been made, as individuals vary so diversely in their agglutinin response to infection or inoculation. The authors have found no evidence to support the view advanced by Tidy that marked pyrexia for some days is associated with diminution or disappearance of T. inoculation agglutinins. None of 38 uninoculated controls showed any trace of agglutinins for T., A. or B., except 4. In one of these there was a definite history of contact and in another a strong probability. Two only could not be accounted for.

52. **Ligature of Right Internal Iliac Artery for Secondary Hemorrhage from Buttock.**—This patient was suffering from a large shrapnel wound of the right buttock, considerable bleeding had occurred, which had been treated with gauze plug and pressure. An operation was performed with the intention of securing the bleeding point. The track was explored, clots were removed, but no definite bleeding vessel was discovered, merely venous ooze, which stopped after the track was thoroughly washed out. Later a slight hemorrhage occurred, and the same day a second severe hemorrhage took place and his condition became serious. A further operation was decided on and the question arose as to the advisability of ligating the internal iliac. The abdomen was opened. The right sacro-iliac synchondrosis was then defined and the ureter and common iliac vessels localized. The posterior layer of the peritoneum was then picked up with forceps, incised, and with blunt dissection the internal iliac artery was defined and the vessel ligated in continuity. The slit in the peritoneum was sewn up and the abdomen was closed. The patient made an uninterrupted recovery, with no further hemorrhage.

Medical Journal of Australia, Sydney

August 26, II, No. 9

53 Cardinal Ligaments; Their Genesis. A. J. Nyulasy.—p. 151.
54 Surgical Experience in Great Britain. R. Bowman.—p. 153.
55 Farm Colony for Consumptives. A. A. Brown.—p. 155.
56 Treatment of Coccal Infections by Creosote. J. F. Merrillees. —p. 157.
57 Depressed Fracture of Skull, with Localizing Signs. D. I. Smith. —p. 158.
58 Case of Pancreatic Suppuration Simulating True Diabetes. D. I. Smith.—p. 158.

Journal de Chirurgie, Paris

XIII, No. 5, pp. 441-644

59 *Fixation of Spine in Good Position by Hibbs' Method in Vertebral Tuberculosis; Three Cases. (Le traitement du mal de Pott par la méthode de Hibbs.) M. Guillot and G. Dehelly.—p. 441.
60 *Lumbar Puncture after Wounds of the Skull. (Valeur de la ponction lombaire dans les plaies du crâne par projectiles de guerre.) R. Leriche.—p. 451.

59. **Hibbs' Operation for Pott's Disease of the Spine.**—Guillot and Dehelly have operated by R. A. Hibbs' method in three cases and state that in all a solid fixation of the spine in a good position was realized and during the twelve and thirteen months to date there has been no indication of new curvature. The children were between 4 and 15. The operation ensures fixation but does not correct preexisting curvature nor cure the disease except by providing better conditions for spontaneous cure. They give six illustrations showing the various procedures which comprise the operation, and they expatiate on the advantage of the child's being up and about in a few weeks, instead of being imprisoned for long months in plaster. A cold abscess accessible from the abdominal wall calls formally for operative treatment of this kind. The only contraindications they recognize are concomitant tuberculous lesions in the lungs or elsewhere, or a posterior cold vertebral abscess or one with a fistula.

60. **Lumbar Puncture After Wounds of the Skull in War.**—Leriche analyzes here the lumbar puncture findings in 121 cases of wounds of the skull, comparing them with the clinical course. His conclusion is that lumbar puncture is of little if any value for the diagnosis and prognosis, but as a therapeutic measure it renders immense service in cases of injury of the skull by a projectile. After trephining, lumbar puncture aids by reducing excessive pressure, thus providing better conditions for recuperation. He repeats it every two or three days when there are extensive lesions and all is going well. If not, he punctures oftener. He has often done lumbar puncture to relieve intense headache of men on their way to a home hospital after an operation near the front. It always relieved the men. One of his own patients had lumbar puncture done twelve times in one month before recovery. There was no retention of urine except for the first afternoon. He warns that lumbar puncture is beneficial in these cases only when the pressure is above normal. When it is low, withdrawal of even a small amount of fluid is liable to bring on headache. He warns further that in case of hernia of the brain, lumbar puncture may cause the hernia to subside spontaneously and this be followed by a slight infectious process.

Journal de Médecine de Bordeaux

September, LXXXVII, No. 11, pp. 211-228

61 Value and Technic of Artificial Pneumothorax. E. Leuret.—p. 211.
62 *Iodin Internally after Injury from Gases. (L'iode et les gaz asphyxiants.) L. Boudreau.—p. 214.
63 Alcohol of Not Much Use for Sterilization of the Hands. (L'alcool employé au lavage des mains en chirurgie.) L. Barthe.—p. 218.
64 Case of Inherited Cerebellar Ataxia. Richaud.—p. 219.

62. **Iodin Internally in Treatment of Injury from Asphyxiating Gases.**—Boudreau's endorsement of iodin internally as a potent means to hasten restoration of living tissues has already been mentioned in these columns, March 4, 1916, p. 775. It has been found particularly useful in pulmonary tuberculosis to promote rapid repair, and he here announces with special stress that injury from the asphyxiating gases calls for iodin internally. He gives the iodin in the form of the tincture. (The French tincture is the one meant. One part of iodin dissolved in 12 parts 90 per cent. alcohol.) A drop or two of the tincture is added to each glass of water, milk, tea or other beverage taken during the day, so that from five to seven doses are thus taken. The dose is increased by 1 drop each day until some of his patients reached 300, 400 or even 600 drops a day, and kept this up a long time. "The disease does not sleep or rest, and the treatment should be correspondingly continuous." The lungs suffer from intoxication with gases, industrial or military, and this intensive iodin treatment is a potent aid in the recuperation of the lung tissue.

Paris Médical

September 9, VI, No. 37, pp. 225-240

65 Filiform Drainage in Prevention and Treatment of Suppuration Around Purulent Focus in the Knee. (Les abcès périarticulaires compliquant les arthrites purulentes du genou.) H. Chaput.—p. 225.
66 *Causes of Sudden Death after Removal of Tracheotomy Cannula. (Mort subite d'un soldat atteint d'une blessure au larynx après enlèvement d'une canule à trachéotomie.) M. Courtois-Suffit and R. Giroux.—p. 227.
67 *Local Anesthesia for Operations on the Skull. (L'anesthésie locale en chirurgie d'ambulance, particulièrement en chirurgie cranienne.) J. Quénu.—p. 229.
68 Electric Device to Detect Deception in Respect to Nocturnal Incontinence of Urine. Uteau and E. Richardot.—p. 233.
69 *Condensed Milk in Rice Water in Treatment of Diarrhea. (Nouveau traitement des diarrhées par le lait condensé dilué dans de l'eau de riz.) P. Lassablière.—p. 235.

September 16, No. 38, pp. 241-256

70 *Biologic Study of Gangrenous Wounds Treated by the Carrel-Dakin Method; Two Cases. N. Fiessinger and P. Moiroud.—p. 242.
71 Uselessness and Dangers of Early Tube Drainage for War Wounds. P. Bertein.—p. 248.
72 Extraction of Projectiles by Modern Technic. Phocas.—p. 251.
73 *Fracture of the Body of the Second Cervical Vertebra. (Fracture de l'apophyse odontoide et du corps de l'axis.) G. Réchou and H. Bichat.—p. 253.

66. **Sudden Death After Removal of Tracheotomy Cannula.**—The necropsy described showed that the irritation from the cannula had caused proliferation of tissue to form a polyp-like excrescence from exuberant granulations. This dropped down into the trachea, obstructing it completely after the

cannula had been removed. Moure and others have noticed proliferation of the laryngeal mucosa in these circumstances, and the possibility of suffocation from this cause after detubation should be borne in mind. It may explain many cases attributed to nervous inhibition.

67. **Local Anesthesia in Treatment of War Wounds.**—Quénu refers in particular to multiple wounds, citing a number of typical cases of shell wounds at various points. By using local anesthesia for some, spinal anesthesia for others, with possibly a few whiffs of some general anesthetic, it was possible to give operative treatment to all the wounds without depressing the patient's vitality too much. General anesthesia alone would be too prolonged for safety with wounds at many different points.

69. **Condensed Milk in Rice Water in Treatment of Diarrhea.**—Practically this same article has already been summarized as it appeared elsewhere. One part of condensed milk in four parts of rice water is the formula, and with 1 or 2 quarts of this a day Lassablière has obtained most excellent results in 256 cases of acute enteritis and also in three cases of confirmed bacillary dysentery. No medication was given in seventy-two of the cases, the men getting nothing but the condensed milk in rice water although they were having from six to thirty stools a day, with colics and sometimes pronounced tenesmus. On the milk-rice water they recovered completely in five days on an average. In a similar series of thirty-two cases treated with the usual other measures, recovery was not reached under twenty-six days.

70. **Biologic Study of Gangrenous Wounds Given Continuous Treatment with Hypochlorite Solution.**—Fiessinger and Moiroud state that the extensive and deep shell wounds of the forearm were gangrenous, both aerobic and anaerobic germs being found in them. The infection was localized, there being no closed cavity, and under the influence of the continuous moistening with the sterilizing fluid the mortified tissues lining the wound melted off, as it were, no eschar forming. By the sixth or seventh day the red granulating surface was exposed, repair proceeding vigorously. This rapid detergent action was the most striking feature of the treatment, the gangrenous wound showing active repair by the eighth day at longest. It removes the conditions which favor proliferation and spread of bacteria, and the process remains strictly localized while the hypochlorite after dissociating the proteic medium reaches the microbe and has a sterilizing action on it. But the main importance of the Dakin fluid kept in constant contact with the wounded tissues is its chemical detergent action, melting the devitalized tissues and thus facilitating their exodus. They add that a 5 per cent. solution of sodium chlorid checks the dissolving action of hypochlorites and is used in tanneries for this purpose. Applied around the wound it prevents caustic action from the hypochlorites, without the macerating influence of petrolatum.

73. **Fracture of the Axis.**—In the case reported only the odontoid process was fractured while the whole vertebra was slightly dislocated. The fracture occurred from a fall down stairs and entailed hemianesthesia but there were no motor disturbances. Treatment was by extension in plaster; the outcome of the case is not known.

Presse Médicale, Paris

September 14, XXIV, No. 51, pp. 405-412

74 *Superiosteal Removal of Splinters of Bone after Fractures. (L'esquillectomie sous-périosté large primitive.) R. Leriche.—p. 405.
75 Dysentery and Dysenteriform Diarrhea. L. Giroux.—p. 408.

74. **Subperiosteal Removal of Sequesters After Fractures.**—Leriche gives twenty-two illustrations of war fractures and the preferable technic for treating them. For twenty-three months he has made a practice of removing sequesters while leaving the periosteum. In some cases he had to perform a secondary operation as sequesters, in the vitality of which he had trusted, were finally cast out. A more complete primary operation would have saved this. In three cases there was exuberant callus, the periosteum having become infected. If the focus of the fracture had been opened up more freely, this might have been avoided. In all the other cases the fracture healed simply and completely, and in his 230 cases there never was a pseudarthrosis from loss of the sequesters. In short, he declares, sequestrectomy when surgically indicated is physiologically permissible. If done subperiosteal, it can be extensive and thorough, the intact periosteum promptly undertaking the work of repair. The aim should be to ensure an aseptic immediate and definite course of the healing at the focus of a fracture by a projectile. This provides conditions for aseptic repair of the solution of continuity, which is of primordial interest for the future of the wounded.

The dread of pseudarthrosis should be supplanted by the just fear of subacute and chronic osteitis. The latter is what renders so grave the outlook for fractures given inadequate operative treatment, all of which can be easily avoided by prompt and thorough sequestrectomy, removing all scraps that may ever need to be cast off, not only the free sequesters but those discovered after removal of the adherent sequesters masking the intramedullary focus of contusion. A well opened up wound continues to suppurate only when there is something still left there to be eliminated. The sacred dogma of always leaving adherent sequesters in place has been overthrown by the experiences of the war. But the periosteum must all be preserved. It must be gently and patiently detached from the bone; any haste is liable to leave the osteogenic layer clinging to the bone, while this is the essential tissue that ensures repair. Twenty-two illustrations show the sequence of the processes of repair and the fine functional outcome. Gaps of 5, 6 or 7 cm. fill up with new bone and stumps are solidly bridged.

Correspondens-Blatt für Schweizer Aerzte, Basel

September 9, XLVI, No. 37, pp. 1153-1184

76 Simple and Rapid Method for Estimating the Hardness of Roentgen Tubes. (Ueber eine einfache und rasche Bestimmung der Röhrenhärte bei Röntgenaufnahmen.) G. Perlet.—p. 1153.
77 *Dietetic Treatment of Deficient Gastric Secretion. (Die Achylia und Hypocholia gastrica incl. den achylischen Darmdyspepsien und ihre diätetische Therapie.) A. Fischer.—p. 1157. Commenced in No. 36, p. 1121.
78 Health Insurance of the Soldiers in Switzerland. (Militär-Versicherung und Tuberkulose.) F. Gehrig.—p. 1166; (Erwiderung). R. Staehelin.—p. 1169.

77. **Dietetic Treatment of Gastric Achylia and Resulting Intestinal Disturbance.**—Fischer is chief of a Swiss sanatorium and in this long article he emphasizes the importance of dietetic treatment of secretory insufficiency of the stomach. To make up the deficit in hydrochloric acid and pepsin is by no means all that is required. We should aim to influence and restore to normal the fine functional interplay of the digestive organs, as the manifold manifestations resulting from achylia include not only metabolic disturbances but also nervous symptoms impairing the general health. He reviews the history of achylia, saying that there is evidence to prove that it may occur from functional disturbance alone, especially in young persons with a neuropathic or other constitutional predisposition. One of his patients with achylia at 25 and during the ten years since to date, has never menstruated since puberty. Most of those who present gastric achylia are of low-powered constitution. The physical inferiority may be congenital or the result of debilitating illness. Depressing nervous influences or abnormal composition of the blood may be responsible. Treatment should aim to supply ample nourishment while sparing the stomach or leaving it at rest as much as possible. Otherwise, food not getting digested irritates the stomach, and this sets up a vicious circle, a chronic gastritis developing from what was purely functional achylia at first. The symptoms of achylia may be insidious or may simulate hyperchlorhydria disturbances, or achylia diarrhea may be the first warning symptom. The bowel troubles with gastric achylia need not entail diarrhea. There may be severe constipation or this may alternate with diarrhea.

The intestinal digestion of fat, of albumin or of carbohydrates may be defective, but as a rule all three suffer, and the bowels must be spared as much as possible. Buttermilk, whey, kefir, and milk sugar render good services here when individualized, as also massage, hydrotherapy, oil enemas,

etc. The meals should be smaller and more frequent, whether the motor functioning is exaggerated or insufficient. Milk may cause digestive disturbance with achylia, for reasons which he enumerates. Buttermilk, yoghurt and whey are borne better. As Pawlow has shown that lactic acid, butyric, acetic and citric acid all stimulate secretion of pancreatic juice, the use of milk in these forms is logical. The teeth should be put in order and hygiene of the table enforced, with scrupulously complete mastication. The diet should aim to keep up the strength while sparing the heart and kidneys to the utmost. When the achylia is due to constitutional physical inferiority, special care must be taken not to overtax the inferior organs in giving tonics, etc. Even when achylia results from a physical defect beyond our power to correct, yet we can adapt our measures to this and strive to compensate for the lacking secretion by calling on the intestinal functions and giving the food in small and frequent meals, mostly in fluid form or soft mashed, with very little if any meat, and this, tender or chopped fine. Tapioca, rice and meringues may be used to give variety. For beverages he allows only tea when the motor functioning is insufficient, and orange flower tea when it is normal, linden flower tea when there is gastrogenous diarrhea, and yoghurt when there is constipation. These beverages are allowed only once a day, at afternoon tea, according to a series of daily menus given.

Gazzetta degli Ospedali e delle Cliniche, Milan

September 7, XXXVII, No. 72, pp. 1121-1136

79 *Puzzling Cases of Pleurisy. (Considerazioni su alcune cause di dubbi diagnostici nella pleurite degli adulti e dei bambini.) A. Sofia.—p. 1127.

79. Differentiation of Pleurisy.—Sofia comments on the puzzling syndrome liable to be presented by inflammation of the pleura in the heart region. The palpitations, dyspnea and precordial pain spreading down the left arm suggest heart or coronary trouble, when in reality there is merely precordial pleuritis without effusion. He has encountered a number of such cases, and others in which inflammation in the pleura of the posterior mediastinum simulated a new growth or glandular trouble or ectasia of the aorta. Another cause of error may be when an encysted interlobar pleuritis perforates into a bronchus. The diagnosis of galloping consumption is almost certain to be made if the disturbances keep up for any length of time. The pleuritis may irritate the phrenic nerve and cause pain localized at a distance. Gerhardt has reported four cases of pain in one shoulder for which pneumonia of the lower lobe, chronic pleurisy without effusion, or pleurisy following an infarct in the lower lobe was responsible. The phrenic nerve was sensitive to pressure in all the four cases. The pain was most severe at the outer rear aspect of the shoulder joint; in two of the cases rheumatic arthritis had been erroneously diagnosed.

Sofia calls attention in particular to the pleuritis accompanying hydrothorax in heart disease, and pleuritis of the diaphragm. With the latter affection, the downward displacement is a differential sign, but when the pleuritis is restricted to the left side there are no objective symptoms although the functional disturbances are pronounced. There is persistence of the vesicular murmur down to the base of the thorax and complete absence of dulness, and exploring the phrenic nerve along its course may suggest the true cause of the disturbances. The pleura may be affected on both sides when only one side is causing symptoms. Bilateral trouble is rendered manifest by Remond's sign on both sides. This is the apparently paralyzed condition of the lumbar muscles where they stand out in relief along the side of the spinous processes, from the twelfth rib to the crest of the ileum. With unilateral pleurisy this lumbar muscular mass seems stretched and does not alter when the trunk is bent over. The ileocostal muscle is contracted and there is no groove as normally between the muscles. He discusses further the differentiation of tuberculous pleurisy from the nontuberculous, and reports the case of a child of 5 taken very sick, presenting vocal tactile fremitus even more pronounced than normal, with an area of dulness at the back in the lower left half of the thorax, and bronchial respiration in this area, fever, vomiting and continuous coughing, all coming on in twenty-four hours. Pneumonia was the presumptive diagnosis at first, but the discovery of the Grocco triangular dulness on the opposite side, and the reduced width and augmented resistance in the intercostal spaces on the affected side, soon revealed that the pleura was the seat of the trouble. The intercostal muscles contract when the pleura is inflamed and this narrows the interspaces. The prompt recovery after exploratory puncture and withdrawal of a few c.c. of a fibrinous serous fluid confirmed the diagnosis of pleurisy.

Policlinico, Rome

September 10, XXIII, No. 37, pp. 1095-1118

80 *Why a Patient with Acute Ataxia is Able to Swim. (Ancora sulla questione perche un ammalato di atassia acuta abbia potuto nuotare benissimo.) A. Marina.—p. 1095.

80. Swimming Possible with Ataxia.—In Marina's case, and also in Luciani's dogs, after removal of the cerebellum complete ataxia rendered walking difficult if not impossible, but swimming was done without effort. Marina's patient was a boy of 13 left with aphasia, chorea and other nervous disturbances after typhoid. By the end of three months there was some improvement but the ataxia had grown more pronounced and affected the entire body. No signs of a cerebellar lesion could be detected. The boy's father had a sea-bathing establishment, and when the boy was placed in the water he swam perfectly. This case has aroused much discussion in Italy, various explanations being advanced.

Brazil Medico, Rio de Janeiro

August 15, XXX, No. 33, pp. 257-264

81 Three Alleged New Species of Flukes. (Trematodeos novos.) L. Travassos.—p. 257.

August 19, No. 34, pp. 265-272

82 Organization and Management of the System of Hospitals and Dispensaries at Rio. (Assistencia publica no Rio de Janeiro.) L. Barbosa.—p. 265. Commenced in No. 30, p. 233.

Semana Medica, Buenos Aires

XXIII, No. 30, pp. 81-106

83 Catarrhal Jaundice. (Ictericia catarral.) C. P. Mayer.—p. 81.
84 Normal Goat Serum in Treatment of Lupus after Curetting. (Sobre el empleo del suero normal de cabra en el lupus vulgar.) A. S. Lagomarsino.—p. 86.

No. 32, pp. 129-150

85 The Tuberculosis Problem in Argentina. (El problema de la tuberculosis. (Antecedentes y observaciones. Intensidad del mal en el pais.) J. Penna.—p. 129.
86 The Biologic Rôle of Filotion. J. de R. Pailhade.—p. 134.
87 Synthetic Biology. (Apuntes de Fisiologia.) T. E. Kundig and A. B. Rillo.—p. 135.
88 Acetonemia Following General Anesthesia in Adults; Three Cases. (Existen crisis acetonemicas?) F. Corredor.—p. 144.

Russkiy Vrach, Petrograd

XV, No. 30, pp. 697-720

89 Historical Sketch of the Evolution of the Conception of Functional Neuroses. (Razvitie ucheniya o funkt. neurozakh.) N. P. K. Trirodoff.—p. 711.
90 Treatment of Fracture of the Hard Palate. (O liechenii oslozhnennikh perelomov tverdago neba.) G. B. Berlatski.—p. 714.
91 Chronic Traumatic Edema of Hands or Feet. (O chron. traumaticheskom otekie konechnostei.) S. M. Rubasheff.—p. 715.

No. 31, pp. 721-744

92 Maternal Impressions, Telegony, etc., from Scientific Standpoint. (Zagadochniya formi nasliedstvennosti.) A. T. Brandt.—p. 721. Commenced in No. 30, p. 697.
93 *Changes in the Leukocytes under the Influence of Repeated Injections of Antityphoid Vaccine. V. I. Glinchikoff.—p. 726. Commenced in No. 30, p. 703.
94 First Aid after Poisoning with Asphyxiating Gases. (O proiskhozhdenii oteka legkikh pri otravlenii udushlivimi gazami.) T. A. Andreeff.—p. 732.
95 Iodin in Internal Treatment. M. A. Germovich.—p. 741.

93. The Changes in the Blood Picture After Repeated Injections of Antityphoid Vaccine.—No knowledge of Russian is required to understand at a glance the fifteen comprehensive tables reproducing the rows of figures representing the various elements of the blood picture as examined from day to day and even from hour to hour on certain days during a thorough course of vaccination against typhoid. The curves show unmistakably that the human organism responds

to every injection of the vaccine with, at first, a reduction in the total leukocyte figure and then a rise which thereafter gradually subsides. This reaction occurs the same whether given amounts of killed typhoid cultures are injected or the living filtrates of the cultures after the bacteria have been strained out. This reaction is the same, further, that is observed after injection of living cultures of staphylococci, diplococci, etc. The wave of leukocytosis is most pronounced after the first injection; it reaches its highest point in about four hours on an average, the increase being proportionally largest in the lymphocytes and neutrophils. Glinchikoff queries whether there is any relation or parallelism between these blood changes and the general reactive phenomena. In some of the cases a parallelism between the clinical manifestations and the blood findings was evident, but in others not.

Nederlandsch Tijdschrift voor Geneeskunde, Amsterdam

September 9, II, No. 11, pp. 901-988

96 *Medical Education. V. (Voortzetting van het praeclinisch onderwijs in de clinische jaren: clinische physiologie.) G. van Rijnberk.—p. 903.

97 *Importance of Castration in Treatment of Myoma of the Uterus. (De waarde der castratie bij myomen der baarmoeder.) M. A. Mendes de Leon.—p. 906.

98 The So-Called Intracorpuscular Conjugation of the Malaria Parasite. (Over de zoogen. "Intraglobulaire conjugatie" van den tropicaparasiet: Laverania malariae.) N. H. Swellengrebel.—p. 914.

99 Success of Emetin in Treatment of Abscess of the Liver; Two Cases. G. J. van Thienen.—p. 930.

100 Rubeola. (Roode hond.) M. W. Scheltema.—p. 924.

96. **Continuance of Preclinical Instruction Into the Clinical Years.**—Van Rijnberk here summarizes and reviews Lee's article on this subject in THE JOURNAL, Feb. 26, 1916, p. 639, continuing his discussion of the readjustment needed in medical education. (The four previous instalments have been reviewed here week by week.) He quotes with approval Lee's remark that the average physician does not know enough physiology and does not have enough of the habit of regarding his patients from the standpoint of physiology, adding, "This may be true of American physicians in particular, but it certainly applies to some extent to the physicians in every land. The physician, Lee says, is much more inclined to think anatomically than physiologically. When he is thinking of an organ, it is its structure, more than its special performance, that springs up in his mind. But what the organ accomplishes is the main thing; medical problems are principally dynamic, not static. They require knowledge of what the organ, tissue or body can accomplish so long as it is healthy. As the physician does not regard things from the physiologic point of view as much as he should, Lee protests against the too exclusive teaching of anatomy, and insists that the teaching of physiology should be continued into the clinical years of the medical course.

"Lee's proposal to continue the teaching of physiology into the clinical years, I regard as extremely important and practical. Whether it is practicable, however, is another question, at least in the Netherlands. But it can do only good to discuss the question. There are three main reasons that may be advanced in favor of this continuation of the teaching of physiology into the clinical years. One reason is that, however much the clinical professors themselves may be impressed with the preeminent importance of the physiologic mode of thought in obtaining a grasp of a morbid syndrome, and however much they may strive to impress this on their hearers, yet the students are attracted so much more by the manifold new things they are learning in regard to diagnosis, therapeutics, etc., that physiology is crowded out. A special course which, as clinical physiology, would keep before their minds the physiologic mode of thought would certainly be of great value. The second reason is that for many facts in pure physiology the conception cannot be complete unless the abstract is supplemented by a concrete example—the conception of ataxia, for instance. An atactic animal does not arouse the same keen and lasting conception of the condition as the sight of a human being with locomotor ataxia. Whole series of researches, demonstrations and tests in the field of physiology would be far more instructive and fruitful than is now the case, if they could be applied and practiced in the clinical years.

"My third reason is that physiology as taught in the preclinical years is mainly the physiology of laboratory animals. Only a few simple tests are made on man, the blood count and hemoglobin test and estimation of the blood pressure. The reason for this is self-evident. Before a test can be applied on a living human subject we must first catch the living subject, and, out of all creation, the one creature that is the hardest to secure for a physiologic laboratory is a human being. The students can apply to each other in the class room only a few simple procedures that do not take much time nor require exposure of the body. Persons who make a business of submitting to tests are hard to get, exacting and troublesome, and hence tests which would prove so much more enlightening when done on man are done merely on cats and rabbits. A course of clinical physiology held in a hospital, where some of the inmates, to pass away the time or for a slight remuneration, would gladly submit to simple tests that do not cause pain, would be a magnificent supplement to the animal physiology that has been taught.

"However odd Lee's words may seem at first, they yet contain valuable seed. Some lecturer, specially trained in physiology and with some practical clinical experience, connected with the clinic for internal diseases could hold a course in clinical physiology. This would have the special advantage that physiology would be more intensively studied—two years is but a short time to glean over this vast field, and a little further training in biologic and clinical physiology would be of great benefit to the future physician."

97. **Castration for Myoma of the Uterus.**—De Leon relates that he has applied castration in treatment of the myomatous uterus in 114 among his 800 patients in this category since 1892. He always examined microscopically scrapings from the uterus when there was the least suggestion of possible cancer, and he excluded from this method of treatment all cases in which the myomas extended to the umbilicus. These very large myomas seldom retrogress completely, and the disturbances are more from compression than from hemorrhage. Three of the women succumbed to the by-effects of the operation, acute peritonitis or pulmonary embolism. In the latter case the very large myoma extended beyond the umbilicus and its torsion had interfered with the circulation. In future he would do hysterectomy in such a case. Omitting cases before 1905, the mortality thus has been 1.58 per cent. In six cases he found it impossible to remove the ovaries when the abdomen was opened, but the results of the castration were entirely satisfactory in 96 of 104. The outcome in eight cases is not known, but as the patients have not returned for further treatment it may be assumed that conditions are satisfactory in them also. In a few cases there were slight and transient hemorrhages from the uterus and a small number continued to menstruate irregularly for a few months. The uterus atrophied in from six to eighteen months; small myomas retrogressed more rapidly in proportion than large ones. There were no serious deficit phenomena in any case, almost all the women being at or near the menopause age. Only a few had headache, congestion and hot flashes, and these soon subsided under sedatives or a little ovarian extract. His experience further confirms Lawson Tait's statement in regard to removal of the ovaries that these organs have as little to do with a woman's sexual appetite as her front teeth have. De Leon never thinks of applying castration in small myomas or those causing no disturbances. He restricts the measure to cases in which either the uterus or the ovaries have to be removed, preferring the latter to myomotomy and to roentgenotherapy. It has the advantage over the latter in being more certain and requiring less time and expense. Only when some organic defect contraindicates castration, he resorts to Roentgen treatment.

Ugeskrift for Læger, Copenhagen

August 31, LXXVIII, No. 35, pp. 1489-1526

101 Papillomatous Growths in the Larynx, Cancerous and Noncancerous. (Papilloma malignum laryngis.) E. Schmiegelow.—p. 1489.